WADC TECHNICAL REPORT 52-336

OPERATIONAL STUDY TO EVALUATE FOOD PACKET, INDIVIDUAL, COMBAT, IN-FLIGHT (IF-4)

GLEN T. NORTON, CAPTAIN, USAF
HARRY C. DYME

AERO MEDICAL LABORATORY

DECEMBER 1952

WRIGHT AIR DEVELOPMENT CENTER

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The information furnished herewith is made available for study upon the understanding that the Government's proprietary interests in and relating thereto shall not be impaired. It is desired that the Judge Advocate (WCJ), Wright Air Development Center, Wright-Patterson Air Force Base, Ohio, be promptly notified of any apparent conflict between the Government's proprietary interests and those of others.

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Sept. 18, 1953 150

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Aero Medical Laboratory

December 1952

RDO No. 696-80

Wright Air Development Center
Air Research and Development Command
United States Air Force
Wright-Patterson Air Force Base, Ohio

FOREWORD

This report by Captain Glen T. Norton, USAF, the project engineer, was prepared under Research and Development Order No. 696-80, "In-Flight Ration Requirements." This study was conducted by the Nutrition Section, Physiology Branch, Aero Medical Laboratory, Directorate of Research, Wright Air Development Center, Air Research and Development Command.

This work would not have been possible without the cooperation of the Commanding Generals, Continental Air Command, Tactical Air Command, Strategic Air Command, Air Defense Command, Air Training Command, the Commander, Military Air Transport Service, and the Chief, Air Weather Service.

Appreciation is extended to the following, with particular awareness of the contributions made by their staffs in Food Service and Base Operations: Commanding Officer, 92nd Air Base Group, Fairchild Air Force Base; Commanding Officer, 325th Fighter Interceptor Wing, McChord Air Force Base; Commanding Officer, 1500th Air Transport Wing, Pacific Division, MATS, Hickam Air Force Base; Commanding Officer 1600th Air Transport Wing, Atlantic Division, MATS, Westover Air Force Base; Commanding General, 3535th Bombardment Training Wing, Mather Air Force Base; Commanding Officer, Mitchel Air Force Base; Commanding Officer, Langley Air Force Base; and the Commanding Officer, 1604th Air Base Group, Kindley Air Force Base.

Grateful acknowledgement is due to Mr. David R. Peryam and Mr. Norman E. Girardot of the Food Acceptance Division, Quartermaster Food and Container Institute, for their critical review of early drafts of the questionnaire employed. The Food Service Section, Air Force Services Division submitted valuable comments relative to the employment of food service personnel as field technicians. Dr. Paul R. Rider, Dr. H. Leon Harter, and 1st Lt Edgar T. Canty, USAFR, of the Applied Mathematics Group, Directorate of Research, provided invaluable guidance in the presentation and evaluation of statistical data. The volume of data screened would have been prohibitive had it not been for the willing assistance of personnel assigned to the International Business Machine Computation Section, Mathematics Research Group, Directorate of Research. Their recommendations concerning the system of tabulation used, as well as their assistance in cataloging the responses of the subjects, provided entries at the rate of 400 per minute with the precision and readability of a well-edited financial statement.

The work of Captain Everett Shocket, USAFR (MC), in supervising the field aspects of the survey at three eastern installations, will be remembered as typical of the zeal and thoroughness of this officer.

ABSTRACT

This report contains results of a survey to evaluate the acceptability of Food Packet Individual, Combat, In-Flight (IF-4). This survey involved the responses of 1771 subjects at eight United States Air Force Bases. The results indicated acceptability for most food items contained in the packet. This report also contains recommendations for revision of the specifications to improve or delete certain items contained in the packet.

PUBLICATION REVIEW

This report has been reviewed and is approved.

FOR THE COMMANDER:

Robert H. Blount

ROBERT H. BLOUNT
Colonel, USAF (MC)
Chief, Aero Medical Laboratory
Directorate of Research

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INTRODUCTION

The formal in-flight meal had its inception early in 1947, when individual experimental menus were first evaluated by the Aero Medical Laboratory. These initial menus were assembled from selected items of the old 10-in 1 and E Rations, and included meat, bread, fruit, dessert and accessory items. A complete review of the data collected and conclusions reached at that time can be found in Memorandum Report, MCREXD-691-2A, entitled Individually Packaged In-Flight Meal, published 15 June 1948, by the Air Materiel Command.

From the information gathered, a specification was formulated to guide the procurement of five hundred packets by the Quartermaster Food and Container Institute. These were forwarded to the Air Proving Ground, Eglin Air Force Base for evaluation. Disclosures of APG's findings may be reviewed in their report, Test of In-Flight Rations, project number 3-47-87, dated 14 May 1948.

Subsequent to modification of these earliest versions of the in-flight packet, the IF-2 and IF-3 developments were field tested at Carswell Air Force Base at the request of Headquarters, Strategic Air Command, under sponsorship of the Air Proving Ground. The results of this study were published as a report of the Air Proving Ground, entitled, Evaluation of In-Flight Meals at Strategic Air Command Bases, dated 31 October 1949, project number 34950---5.

The IF-4 modification of the Food Packet, Individual, Combat, In-Flight has been evolved, therefore, from a series of improvements in preceding procurements.

The study set forth in this report was motivated by the need for measuring the proximity to which the IF-4 modification has approached maximum acceptability and to reveal those areas where further effort may be most profitably directed.

The survey to which the following pages are devoted involves a larger number of subjects, encompasses more diversified sources of information and employs more refined methods of tabulation and analysis than have its predecessors. Review of the series is gratifying in showing how consistently each procurement has been improved. That the IF-4 is superior to past modifications there can be no doubt. The results of this study demonstrate conclusively that in its present form it is a good product. With slight alteration, it can be expected to command more nearly universal approval. It seems entirely possible, through the implementation of the recommendations contained herein, to elevate the level of acceptability in the next modification of the In-Flight Food Packet series to a point where further development will no longer be rewarding.

HEADQUARTERS

Wright Air Development Center

WRIGHT-PATTERSON AIR FORCE BASE, OHIO

IN REPLY ADDRESS BOTH COMMUNICATION AND ENVELOPE TO COMMANDING GENERAL, WRIGHT AIR DEVELOPMENT CENTER, ATTENTION FOLLOWING OFFICE SYMBOL:

DCRDF

DCRDF/GTN/ebs
26 April 1951

SUBJECT: Field Survey of In-Flight Packet

TO: Commanding General
Strategic Air Command
Offutt Air Force Base, Nebraska
ATTN: Food Service Staff Officer

1. In an effort to improve in-flight feeding, and to achieve more acceptable and convenient flight-feeding procedures for the promotion of efficiency and morale among Air Force personnel, the Aero Medical Laboratory, Research Division, of this Command plans to conduct a preference and acceptability survey to obtain data on the food Packet, Individual, Combat, In-Flight (IF-4) at suitable bases within the various Commands.

2. The bases selected should have certain characteristics which recommend them for such a study. They should qualify under the following criteria:

a. Each base designated should be capable of furnishing teams of preferably five and not less than three airmen from its Food Service component to administer the survey at that installation.

b. Designated bases should have a normal volume of air traffic which will enable them to secure data on a minimum of 240 packets served in flight to different individuals within a period of 60 days.

c. Bases whose principle flight activity is the operation of fighter aircraft are not considered qualified for this survey since the food packet under investigation is not designed for use on this type aircraft.

d. Designated bases should be physically located within the continental limits of the United States, in Alaska, or in the Caribbean area. This prerequisite is not intended to exclude utilization of flights whose destination is outside such limits provided the flights are initiated within them.

e. There should be no alternate methods of in-flight feeding currently being evaluated at designated bases.

3. Crews and Air Force personnel on flights whose missions are concerned with transportation of personnel and/or cargo, navigational training, simulated combat, air-sea rescue, courier operation, or long-range weather investigation are all considered desirable participants.

4. A project officer will be available to visit those bases designated to indoctrinate assigned airmen-teams and to initiate the survey.

5. Rations will be provided on an experimental basis not chargeable to the Command or to the individual consumer.

6. It is requested that bases concerned be authorized direct communication with this Headquarters.

7. The cooperation of the Strategic Air Command in conducting this survey will greatly facilitate the establishment of the proper nutritional requirements upon which to base in-flight packet development and thus assist in maintaining high morale among Air Force personnel.

8. A reply by indorsement hereon is requested listing those Air Force bases within your Command which are considered suitable for use by this Headquarters in conducting this study. Your assistance in making this survey possible will be sincerely appreciated.

FOR THE COMMANDING GENERAL:

WALTER A. CARLSON
Colonel, USAF (MC)
Chief, Aero Medical Laboratory
Research Division

Figure 1. Letter to Major Commands

PROCEDURAL TECHNIQUES

The initial steps in pursuit of the information presented here were taken in April 1951. At that time correspondence (Fig. 1) was addressed to 10 major Commands requesting nomination of bases within their respective jurisdiction which might be considered suitable for a study of the type contemplated. Criteria for use in judging the suitability of bases were provided. In response to this inquiry, seven Commands submitted a list of twenty-one bases from which eight were ultimately selected for participation in the survey. An effort was made to utilize bases whose missions differ, in order that representation of Air Force-wide opinion might be obtained. Where a given Command recommended several bases, selection was influenced by their geographical proximity to participating bases of other Commands.

As correspondence traveled back and forth in the interest of bases for field activities, development of a questionnaire with accompanying forms was under way. Of the principles which guided this development, the need for a form both readily understandable to the subject and yet productive of the volume of specific information required, was constantly in mind. To facilitate efficient tabulation of raw data, the advantages of incorporating margins for International Business Machine coding as an integral part of the questionnaire appeared obvious. To assist in the computation of the tabular portion of the questionnaire, perforated sheets were designed in a fashion which permitted them to be superimposed upon basic sheets containing the gravimetric information supplied by field technicians. Because the perforated sheet contained columns for entering information with which the technician was not concerned, it was felt that the arrangement would serve to minimize the chances for error inherent in presentation of superfluous detail. Although the completely-assembled questionnaire as submitted for transcription to IBM cards consisted of nine pages for each subject, the subject himself had seen only two pages; these were in hinged booklet form. The technician was concerned only with base sheets of the three tables wherein he entered his gravimetric determinations, plus one sheet of general questions pertaining to a particular flight. The technician enclosed these completed four pages within the booklet pages completed by the subject and forwarded the total to the Nutrition Section, Aero Medical Laboratory. At the Laboratory, the perforated sheets were added, the completely assembled questionnaire coded in accord with the specifications of the IBM Computation Section, and the entire nine pages of data pertaining to a given subject forwarded to the key-punch operator, who, in turn, transcribed all coded data to two IBM cards. Because of the quantity of data, 160 card columns were required for each subject. The answers from the tabular portion of the questionnaire, therefore, were coded upon a specially designed form (Fig. 2) from which the key-punch operator might transcribe directly to the second of two IBM cards. The first IBM card was punched directly from the borders of the questionnaire which had been designed to facilitate such a procedure. This border was folded, however, so that the subject was not confronted by other than that part of the form which pertained to the information he was called upon to supply. (Fig. 3)

Before the questionnaire was sent to the printer in final form, several drafts were prepared. Revisions leading to acceptance of the

final manuscript were made in consideration of critical comment which the project officer solicited from the Quartermaster Food and Container Institute; the Psychology Branch, Aero Medical Laboratory; the Food Service Section, Air Force Services Division; the Applied Mathematics Group, Directorate of Research; and the IBM Computation Section, Mathematics Research Group, Directorate of Research.

Numerical entries which appear in the questionnaire, and pertain to caloric content of various items, were obtained from Record of Nutritive Values, dated 30 August 1950, published by the Quartermaster Food and Container Institute.

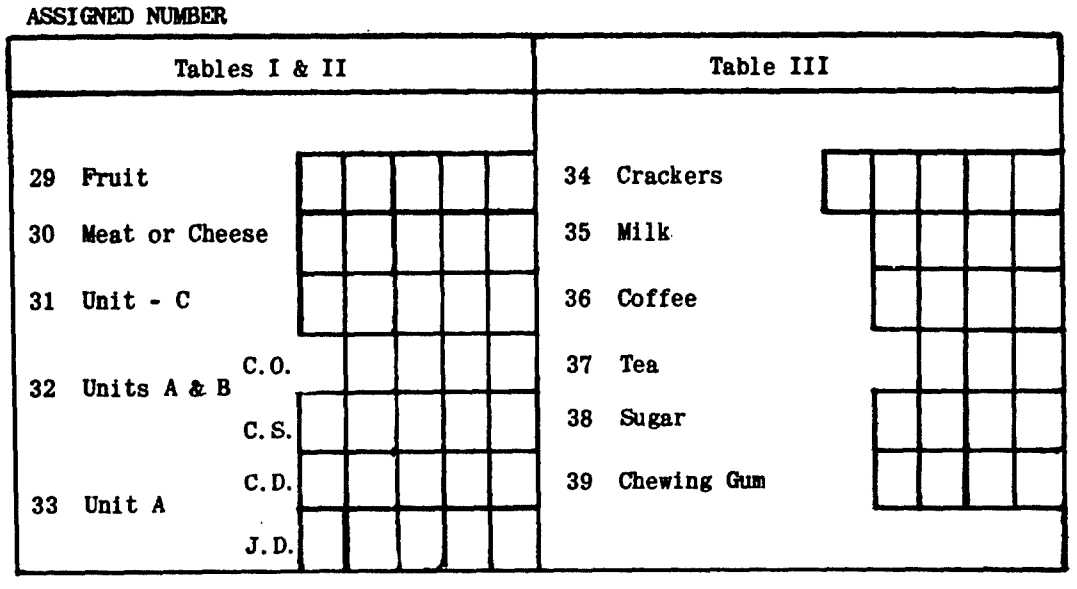


Figure 2. IBM Food Preference Card

Shipment of survey supplies and equipment to the eight participating bases was begun as soon as the questionnaires were returned from the printer. Each shipment consisted of 300 questionnaires, three insulated containers (Meese Bags), three balances, India ink, pencils, "briefing sheet", 50 return-addressed penalty envelopes and 14 cases of IF-4 Food Packets.

The project officer and his colleague departed for the field in September, 1951, proceeding from one installation to the next, initiating the survey program at each in turn. Generally, a ten-day period was spent at each given base. This proved to be sufficient time to indoctrinate personnel, establish coordination between the various components concerned and to witness the initial application of prescribed techniques at each station.

Figure 3. Questionnaire, Completely Assembled (pp. 3-11)

IF-4 FOOD PREFERENCE AND ACCEPTABILITY QUESTIONNAIRE

1. NUMBER ASSIGNED _____ 1. ☐☐☐☐ 01-04
2. DATE _____ 2. ☐☐☐☐ 05-08
3. WEIGHT _____ 3. ☐☐ 09-10
4. AGE _____ 4. ☐☐ 11-12
5. RANK OR GRADE _____ 5. ☐☐ 13-14
6. YEARS OF MILITARY SERVICE _____ YRS. 6. ☐☐ 15-16
7. TOTAL FLYING TIME _____ HRS. (RATED PERSONNEL ONLY) 7. ☐ 17
8. YOU ARE ON THIS FLIGHT IN THE CAPACITY OF: CREW MEMBER ☐ PASSENGER ☐ 8. ☐ 18
9. NUMBER OF HOURS SINCE YOUR LAST REGULAR MEAL _____ HRS. 9. ☐☐☐ 19-21
10. CLASSIFY THIS LAST REGULAR MEAL BY PLACING A CHECK MARK IN THE APPROPRIATE SQUARE. 10. ☐ 22

	LIGHT	MODERATE	LARGE
BREAKFAST			
LUNCH			
DINNER			

11. DURING THE FLIGHT, DID YOU EAT ANY ITEMS WHICH YOU MAY HAVE BROUGHT ABOARD, SUCH AS CANDY, FRUIT, ETC? 11. ☐ 23

	YES	NO
BEFORE OPENING YOUR RATION		
WITH YOUR RATION		

IF YES, LIST ITEMS _____

12. WHAT LIQUIDS DID YOU CONSUME? (_____CUPS) 12. ☐☐☐ 24-26

	MILK	CHOC. MILK	SOFT DRINK	TEA	COFFEE	WATER	OTHERS	NONE
WITHIN 2-HRS. BEFORE RATION								
WITH YOUR RATION								

13. IF TEA AND/OR COFFEE WERE CONSUMED, WERE THEY PREPARED FROM ITEMS IN THE RATION? 13. ☐ 27

	YES	NO
COFFEE		
TEA		

14. WERE YOU AWARE OF ANY PHYSICAL DISTRESS OR EMOTIONAL STRAIN PRIOR TO YOUR FLIGHT? YES ☐ NO ☐ 14. ☐ 28

IF YES, INDICATE NATURE: _____

15. DID YOU CONSIDER THE FLIGHT: 15. ☐ 29
- SMOOTH ☐
- SLIGHTLY ROUGH ☐
- VERY ROUGH ☐

16. YOUR MEAT ITEM WAS: 16. ☐ 30
- HEATED ☐
- NOT HEATED ☐
- NOT TRIED ☐

17. DID YOU FIND THE CANS DIFFICULT TO OPEN? YES ☐ NO ☐ 17. ☐ 31

IF YES, GIVE NATURE OF DIFFICULTY _____

18. WOULD YOU ADD TO OR SUBTRACT FROM THE AMOUNT IN ANY OF THE FOLLOWING: 18. ☐☐☐☐☐ 32-36

	ADD TO	SUBTRACT FROM	NO CHANGE
FRUIT CAN	☐	☐	☐
MEAT-OR-CHEESE CAN	☐	☐	☐
DESSERT CAN	☐	☐	☐
CRACKER CAN	☐	☐	☐
ACCESSORY PACKET	☐	☐	☐

NUMBER ASSIGNED_____

QUESTIONS TO BE ANSWERED BY TECHNICIAN

19. TYPE OF AIRCRAFT USED ON THIS FLIGHT ?

- B-36 ☐
- B-50 ☐
- B-29 ☐
- B-17 ☐
- B-25 ☐
- B-26 ☐
- C-54 ☐
- C-47 ☐
- C-121 ☐
- OTHER ☐

SPECIFY_____

19. ☐ 56

20. WAS WATER READILY AVAILABLE DURING THE FLIGHT ?

YES ☐ NO ☐

20. ☐ 57

21. WHAT WERE CONDITIONS OF TEMPERATURE AND HUMIDITY ?

TEMPERATURE		HUMIDITY	
COMFORTABLE	☐	LOW (DRY)	☐
COLD	☐	NORMAL	☐
HOT	☐	HIGH (MOIST)	☐

21. ☐ 58

22. WHICH OF THE FOLLOWING FOOD-HEATING UNITS WERE AVAILABLE ?

- B-1 FOOD WARMER ☐
- B-2 FOOD WARMER ☐
- B-4 FOOD WARMER ☐
- HOT CUP ☐
- OTHER ☐
- NONE ☐

22. ☐ 59

TABLE I

CONSUMPTION CHART - PERFORATED SHEET

	WEIGHT IN GRAMS						
	A	B	C	D	E	F	X
	GROSS	TARE	NET	GROSS BALANCE	CALORIC CONTENT	% INTAKE	CALORIC INTAKE
PINEAPPLE	224.5	47.9	176.6		133		
FRUIT COCKTAIL	221.5	47.9	173.6		119		
PEACHES	225.1	47.9	177.2		116		
PLUMS	227.3	47.9	179.4		129		
PEARS	223.2	47.9	175.3		116		
CHICKEN	217.4	45.3	172.1		368		
HAMBURGER	211.6	45.3	166.3		359		
BEEF AND PORK LOAF	224.1	53.8	170.4		471		
CHEESE (PROCESSED)	225.5	45.8	179.7		656		
MEAT, GROUND WITH SPAGHETTI	207.4	45.3	162.1		203		
BEEF AND CORN	218.6	45.3	173.3		299		
HAM AND EGGS	208.5	48.7	159.8		362		
MEAT AND NOODLES	218.9	45.3	173.6		258		
BEEF STEAK	220.5	45.3	175.2		398		
HAM, FRIED	219.1	45.3	173.8		429		
DESSERT UNIT - C							
POUND CAKE	118.1	55.9	62.2		302		
FRUIT CAKE	187.3	55.9	131.2		516		
DATE PUDDING	208.0	55.8	152.2		432		

DIRECTIONS:

1. RECORD OPPOSITE THE APPROPRIATE ITEM IN THE GROSS-BALANCE COLUMN THE WEIGHT OF THE ORIGINAL CAN, IT'S TOP, AND THE REMAINDER OF IT'S CONTENTS.

   NOTE - IN WEIGHING DESSERT UNIT - C, BE SURE TO INCLUDE THE WEIGHT OF THE KEY, WITH METAL STRIP ATTACHED.

2. WHEN AN ITEM HAS NOT BEEN OPENED, RECORD THE SAME NUMBER IN COLUMN D THAT APPEARS IN COLUMN A.

3. WHEN AN ITEM HAS BEEN COMPLETELY CONSUMED, RECORD THE SAME NUMBER IN COLUMN D THAT APPEARS IN COLUMN B.

TABLE I

CONSUMPTION CHART

	WEIGHT IN GRAMS			
	A	B	C	D
PINEAPPLE	224.5	47.9		
FRUIT COCKTAIL	221.5	47.9		
PEACHES	225.1	47.9		
PLUMS	227.3	47.9		
PEARS	223.2	47.9		
CHICKEN	217.4	45.3		
HAMBURGER	211.6	45.3		
BEEF AND PORK LOAF	224.1	53.8		
CHEESE (PROCESSED)	225.5	45.8		
MEAT, GROUND WITH SPAGHETTI	207.4	45.3		
BEEF AND CORN	218.6	45.3		
HAM AND EGGS	208.5	48.7		
MEAT AND NOODLES	218.9	45.3		
BEEF STEAK	220.5	45.3		
HAM, FRIED	219.1	45.3		
DESSERT UNIT - C				
POUND CAKE	118.1	55.9		
FRUIT CAKE	187.3	55.9		
DATE PUDDING	208.0	55.8		

DIRECTIONS:

1. RECORD OPPOSITE THE APPROPRIATE ITEM IN COLUMN D THE WEIGHT OF THE ORIGINAL CAN, IT'S TOP, AND THE REMAINDER OF IT'S CONTENTS.

   NOTE - IN WEIGHING DESSERT UNIT - C, BE SURE TO INCLUDE THE WEIGHT OF THE KEY, WITH METAL STRIP ATTACHED.

2. WHEN AN ITEM HAS NOT BEEN OPENED, RECORD THE SAME NUMBER IN COLUMN D THAT APPEARS IN COLUMN A.

3. WHEN AN ITEM HAS BEEN COMPLETELY CONSUMED, RECORD THE SAME NUMBER IN COLUMN D THAT APPEARS IN COLUMN B.

TABLE II

CONSUMPTION CHART - PERFORATED SHEET

	WEIGHT IN GRAMS				
	A	B	C	D	E
	NET WEIGHT	NET BALANCE	CALORIC CONTENT	% INTAKE	CALORIC INTAKE
DESSERT UNIT - A					
COOKIE, OATMEAL - CHOCOLATE CHIP	14.4		65		
COOKIE, SANDWICH	22.7		110		
CHOCOLATE DISC	29.4		146		
STARCH - JELLY DISC					
LEMON	35.8		101		
ORANGE	35.8		101		
CHERRY	35.8		101		
LICORICE	35.8		101		
LIME	35.8		101		
DESSERT UNIT - B					
COOKIE, OATMEAL - CHOCOLATE CHIP	14.4		65		
COOKIES, SANDWICH (2)	45.3		220		

DIRECTIONS:

1. RECORD OPPOSITE THE APPROPRIATE ITEM IN THE NET BALANCE COLUMN B THE WEIGHT OF THE UN-CONSUMED PORTION REMAINING.
2. WHEN AN ENTIRE ITEM, NOT MERELY AN ELEMENT THEREOF, HAS BEEN LEFT, UNEATEN, ENTER THE SAME NUMBER IN COLUMN B THAT APPEARS IN COLUMN A.
3. WHEN AN ENTIRE ITEM, NOT MERELY AN ELEMENT THEREOF, HAS BEEN COMPLETELY CONSUMED, ENTER A "ZERO" IN COLUMN B.

TABLE II

CONSUMPTION CHART

	WEIGHT IN GRAMS	
	A	B
	NET WEIGHT	NET BALANCE
DESSERT UNIT - A		
COOKIE, OATMEAL - CHOCOLATE CHIP	14.4	
COOKIE, SANDWICH	22.7	
CHOCOLATE DISC	29.4	
STARCH - JELLY DISC		
LEMON	35.8	
ORANGE	35.8	
CHERRY	35.8	
LICORICE	35.8	
LIME	35.8	
DESSERT UNIT - B		
COOKIE, OATMEAL - CHOCOLATE CHIP	14.4	
COOKIES, SANDWICH (2)	45.3	

DIRECTIONS:

1. RECORD OPPOSITE THE APPROPRIATE ITEM IN COLUMN B THE WEIGHT OF THE UN-CONSUMED PORTION REMAINING.
2. WHEN AN ENTIRE ITEM, NOT MERELY AN ELEMENT THEREOF, HAS BEEN LEFT, UNEATEN, ENTER THE SAME NUMBER IN COLUMN B THAT APPEARS IN COLUMN A.
3. WHEN AN ENTIRE ITEM, NOT MERELY AN ELEMENT THEREOF, HAS BEEN COMPLETELY CONSUMED, ENTER A "ZERO" IN COLUMN B.

TABLE III

CONSUMPTION CHART - PERFORATED SHEET

	NUMBER PACKED	NUMBER REMAINING	DIFFERENCE	CALORIC CONTENT	% INTAKE	CALORIC INTAKE
CRACKERS	5			222		
SOLUBLE MILK	2			34		
COFFEE	2			22		
TEA	1			4		
SUGAR	4			46		
CHEWING GUM	2			12		
SALT	1					
PEPPER	1					

DIRECTIONS:

RECORD IN THE INDICATED COLUMN THE NUMBER OF ELEMENTS OF EACH LISTED ITEM WHICH WERE NOT CONSUMED.

TABLE III

CONSUMPTION CHART

	NUMBER PACKED	NUMBER REMAINING
CRACKERS	5	
SOLUBLE MILK	2	
COFFEE	2	
TEA	1	
SUGAR	4	
CHEWING GUM	2	
SALT	1	
PEPPER	1	

DIRECTIONS:

RECORD IN THE INDICATED COLUMN THE NUMBER OF ELEMENTS OF EACH LISTED ITEM WHICH WERE NOT CONSUMED.

DIRECTIONS

MENU NUMBER _____

THE IF-4 RATION IS MADE-UP OF A FRUIT CAN, A MEAT-OR-CHEESE CAN, A DESSERT CAN, A CRACKER CAN, AND AN ACCESSORY PACKET.

A—SHOW THE ITEM OR UNIT IN THE FRUIT, MEAT-OR-CHEESE, AND DESSERT CANS OF YOUR RATION BY CHECK MARKS IN THE PROPER SQUARES, (☑).
B—SHOW BY A CHECK MARK IN THE PROPER CIRCLE WHICH ITEM IS IN YOUR DESSERT UNIT, (Ø).
C—RATE ALL CHECKED ITEMS, AND THOSE ITEMS TO THE RIGHT OF THE VERTICAL LINES WHICH ARE A PART OF YOUR RATION. DO THIS BY CHECKING IN THE COLUMN WHICH SHOWS MOST NEARLY HOW WELL YOU LIKED AN ITEM. IF YOU HAVE NOT SAMPLED AN ITEM, PLACE A CHECK MARK IN THE "NOT TRIED" COLUMN.
D—LEAVE ALL UNEATEN FOOD IN THE CANS, AND PLACE THE CANS IN YOUR RATION BOX FOR COLLECTION.

CAUTION: PLACE CANS CONTAINING LIQUIDS IN AN UP-RIGHT POSITION!

	FOOD ITEMS	RATING SCALE: LIKE VERY MUCH	LIKE MODERATELY	LIKE SLIGHTLY	NEITHER LIKE NOR DISLIKE	DISLIKE SLIGHTLY	DISLIKE MODERATELY	DISLIKE VERY MUCH	NOT TRIED	REMARKS
FRUIT CAN	☐ PINEAPPLE									
	☐ FRUIT COCKTAIL									
	☐ PEACHES									
	☐ PLUMS									
	☐ PEARS									
MEAT-OR-CHEESE CAN	☐ CHICKEN									
	☐ HAMBURGER									
	☐ BEEF AND PORK LOAF									
	☐ CHEESE, PROCESSED									
	☐ MEAT, GROUND WITH SPAGHETTI									
	☐ BEEF AND CORN									
	☐ HAM AND EGGS									
	☐ MEAT AND NOODLES									
	☐ BEEF STEAK									
	☐ HAM, FRIED									
DESSERT CAN	☐ DESSERT UNIT A									
	COOKIE, OATMEAL-CHOCOLATE CHIP									
	COOKIE, SANDWICH									
	CHOCOLATE DISC.									
	STARCH-JELLY DISC.									
	○ LEMON									
	○ ORANGE									
	○ CHERRY									
	○ LICORICE									
	○ LIME									
	☐ DESSERT UNIT-B									
	COOKIE, OATMEAL-CHOCOLATE CHIP									
	COOKIES, SANDWICH									
	☐ DESSERT UNIT-C									
	○ POUND CAKE									
	○ FRUIT CAKE									
	○ DATE PUDDING									
CRACKER CAN	CRACKERS									
ACCESSORY PACKET	SOLUBLE MILK									
	COFFEE									
	TEA									
	SUGAR									
	CHEWING GUM									
	SALT									
	PEPPER									

23 ☐☐☐☐ 37-40

24 ☐☐ 41-42

25 CO CS CD JD C
A ☐☐☐☐☐
B ☐☐■■■
C ■■■■☐
43-47

26 ☐ 48

27 M C T ☐☐☐ 49-51

28 S CG SA PEP ☐☐☐☐ 52-55

Procedure at Each Station:

Upon arrival at a participating base, the project officer made arrangements through the Food Service Officer to convene the technicians who had been assigned to the project.

Since such personnel were to have been placed on flying status specifically for the purpose of conducting the study, immediate inquiry was made into the status of their flight authorizations.

In several instances, it was disappointing to learn that approval, while expected, had not yet been received. On occasion where action had not been initiated toward this end, it was necessary to have physical examinations for flying completed on each individual prior to securing approval of Headquarters, USAF. Such administrative procedures were frequently the cause of considerable delay in commencing activities. While such matters were being attended to by base authorities, other preparations were completed in anticipation of actual operation. Since the project was unclassified, the project officer had not requested that a security clearance be written into his orders. This fact, also, placed him at a disadvantage at some installations, especially at Strategic Air Command bases. Limited interim clearances were obtained, however, which were satisfactory for the pursuit of his duties, though their procurement was an additional cause of delay. Technicians, too, were required to obtain clearances; however, this was less of a problem since such personnel were under direct control of the Commanding Officer of the base in question and their clearances were, therefore, more liberal and more readily obtained.

Assembled technicians were introduced to the procedures to be followed and the techniques to be employed. The first few days of association with these considerations not only accomplished a cataloging of the rations and a readying of equipment for immediate use, but served, as well, to give those who would be working with them a genuinely detailed understanding of the reasoning behind the mode of operation. Each technician was provided an opportunity to make sample weighings on the gram balances provided and to become thoroughly familiar with their employment.

Blocks of numbers (Fig. 4) possessing a range of 250 digits were assigned to each base. By such means, the origin of any questionnaire might be referred to a given installation. It was found desirable to remove those items which required heating from the ration packets of which they were a part, to heat them collectively, and then return them to the subject who was to consume the packet from which they had been withdrawn. This was made possible by numbering each item removed with India ink to correspond to the number appearing on its packet. India ink proved suitable when applied to the metal can, since the can could be boiled in water without affecting the legibility of the number. The care required in ascertaining that the withdrawn can be returned to the packet from which it had been removed (and not to another packet) was emphasized, otherwise, nonexistent menus would be created and reported upon. It was pointed out that a report on a menu which was not of routine procurement would be declared void. Technicians proceeded to number all cans containing meat

1001 - 1250	Mitchel
1251 - 1500	Westover
1501 - 1750	Kindley
1751 - 2000	Langley
2001 - 2250	Fairchild
2251 - 2500	McChord
2501 - 2750	Hickam
2751 - 3000	Mather
3001 - 3050	Langley

Figure 4. Blocks of Assigned Numbers

items through all 14 cases of rations in accord with these instructions.

Without exception, the center of survey activity at each station was established in the in-flight kitchen. It is common practice for departing crews to arrange through the Operations Officer, sufficiently in advance of take-off time, for in-flight meals. Meals provided within the Zone of Interior are usually of the box-lunch variety, issued under authority of AFR 146-16 and 16A, at a cost of 70 cents to officers, civilians, and to airmen on leave status, and for 40 cents to airmen who ration separately. Agreement was reached between the Operations Officer, Food Service Officer, and Project Officer to substitute the IF-4 Food Packet, free of charge to all military personnel, their adult dependents traveling on official orders and to civilian employees of the gonvernment traveling on official business, in lieu of the customary box-lunch. Upon receipt by the Operations Officer of a request for in-flight lunches, the in-flight kitchen was notified and preparation of the IF-4 Packets was undertaken. The prenumbered meat items were withdrawn from their packets and placed in water, which was then heated to boiling and maintained for five minutes. At a time suitably in advance of the scheduled take-off hour, the cans were removed from the water and placed in insulated containers (Figs. 5, 6). The technician was then delivered with his equipment to the aircraft and placed aboard. A briefing sheet (Fig. 7) was handed to each passenger and crew member as he entered the aircraft; this was intended to arouse his interest and secure his cooperation. At any time after take-off, when an individual expressed a desire to eat, he was given a numbered food packet to which the hot meat item bearing the same number was added. Packets were dispensed at random; selection based upon their content, by the subject or technician, was strictly prohibited. This policy was carefully observed since, in normal field utilization, the packets would be available with their seals unbroken, and therefore, knowledge

of any given packet's content, and consequent selection of packets on such basis, would be impossible. Insulated containers were employed in the study as an expedient in lieu of the B-series ovens which are now being installed aboard Air Force aircraft. These automatic ovens are designed specifically for heating food items as contained in the in-flight food packets and will permit simultaneous preparation of from 8 to 48 items.

Before beginning his meal, the subject was advised to return to the packet each object which was found in the packet originally and not actually eaten. It was explained to him that everything left would be weighed and that his caloric consumption would be computed by difference. At bases where pre-flight briefing of large groups of personnel is routine (Training Command installations), instruction in matters pertaining to the survey was given at such briefings. All subjects, however, were carefully advised of the importance of returning each uneaten object and portion thereof to the packet for collection by the technician.

At stations where given individuals made daily training flights, the problem of assuring that only one IF-4 survey meal was subject to a report by any one person presented some initial difficulty, because the prospect of encountering individuals who had already submitted a questionnaire, along with those who had not done so, aboard the same aircraft, became greater the longer the survey had been in progress. Elimination of this possibility was accomplished through excellent liaison established between the Food Service Officer and the Operations Officer. Since the persons who would compose crews on the next day were

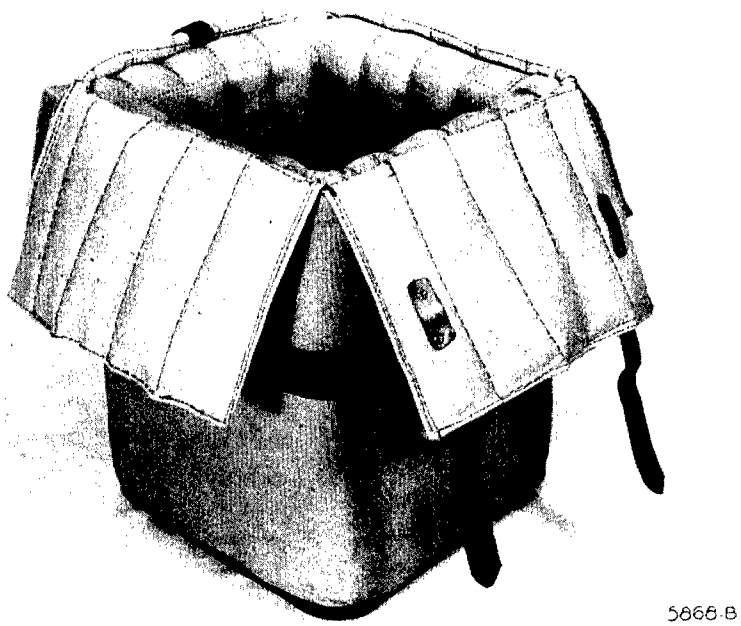


Figure 5. Insulated Container

scheduled the preceding night, by noting those individuals on the roster who had already tested the packet and expressed their opinions, a second reply from the same subject was avoided. The longer the survey had operated at such stations, the greater were the number of customary box-lunches which were provided a given flight in comparison to the number of IF-4 packets substituted for them.

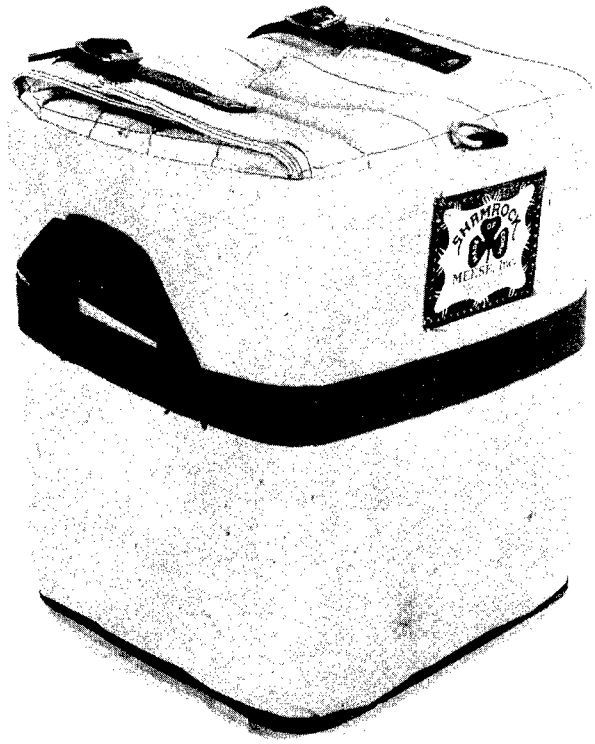


Figure 6. Insulated Container

The technician, having been advised originally by the Operations Officer of the destination and duration of the flight, and whether or not the aircraft would return to its base of departure or to another base at which the survey was being conducted, was able to determine the feasibility of transporting his balance in addition to his other equipment. On flights which were to remain over night at other installations, the technician carried the balance, conducted his weighings at the completion of the flight, recorded the results, and discarded the packet and its remnants. On flights returning to the same base from which they had departed, the collected packets were usually returned, weighed and the results recorded. By providing portable cases for transportation of the balances (Fig. 8), the backlog of material for tabulation was kept to a minimum, the food remnants were cataloged before decomposition could affect them, and the technician was given a convenience, which, in view of the arduousness of his duties, was a welcome asset. Upon recording his determinations on the basic tables designed to be a part of the questionnaire, the technician placed all data collected on the flight in an addressed penalty envelope and dispatched it to the Aero Medical Laboratory.

F O O D

A FOOD TECHNICIAN IS ABOARD THIS AIRCRAFT WITH FREE SAMPLES OF THE NEW IN-FLIGHT RATION.

YOU ARE INVITED TO TRY A PACKET AND FILL OUT A BRIEF QUESTIONNAIRE.

PLEASE REMEMBER -

...YOUR ANSWERS TODAY WILL DETERMINE WHAT WE WILL ALL BE EATING NEXT YEAR

...RETURN THE REMAINS OF YOUR PACKET (CAN TOPS, METAL KEYS, ETC.) TO THE TECHNICIAN FOR WEIGHING.

...COMPLETE QUESTIONNAIRE BEFORE EATING ANY OTHER FOOD.

F O O D

Figure 7. Briefing Sheet

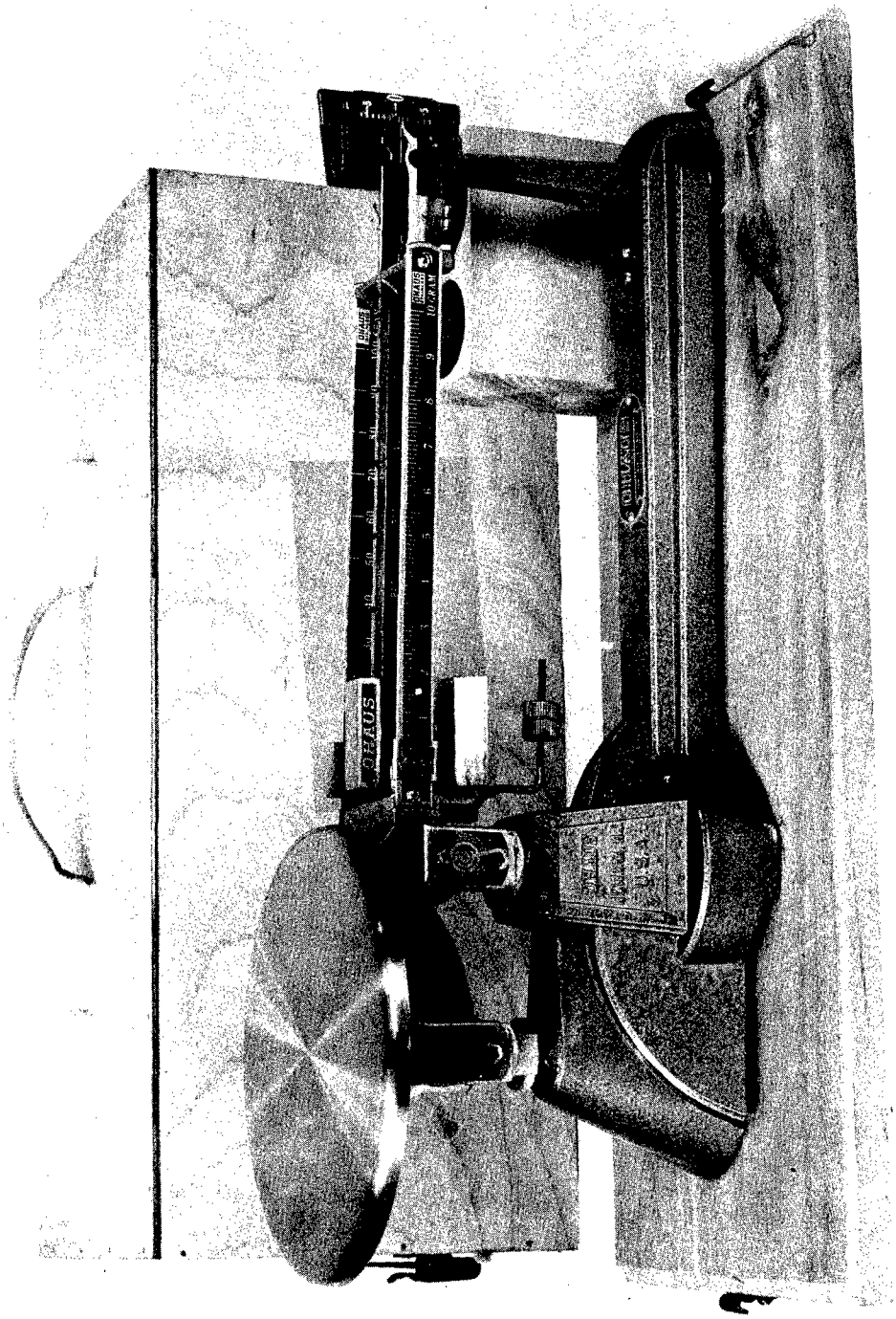
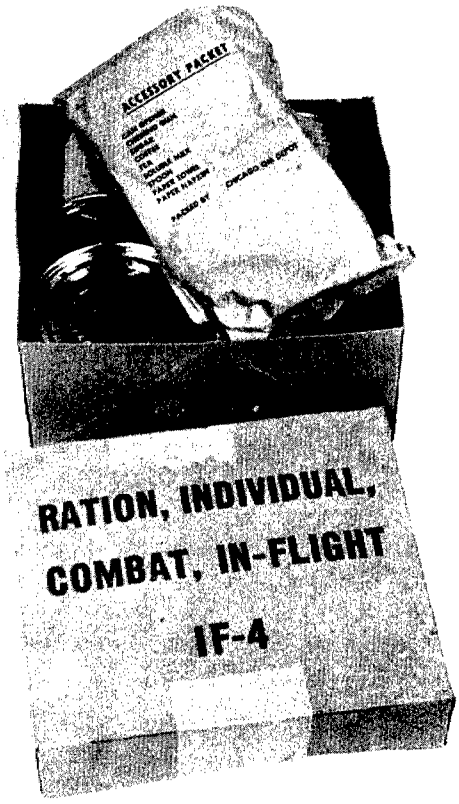
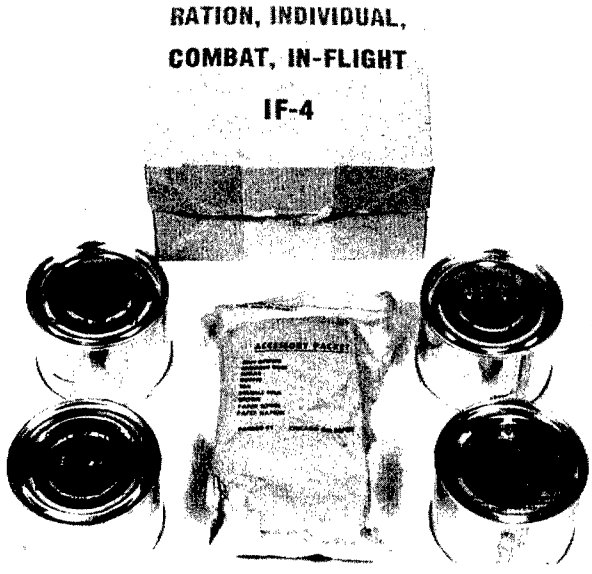
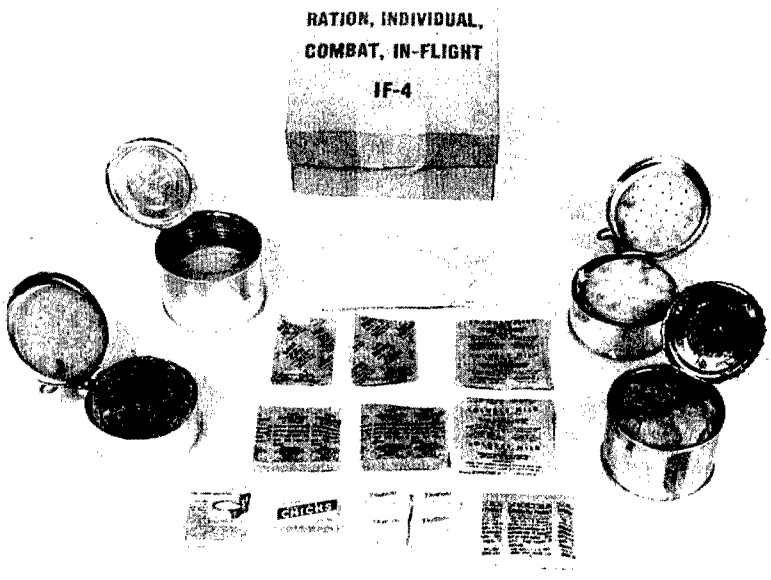


Figure 8. Balance Used for Weighings, with Case







Figures 9, 10 and 11

IF-4 Packet

5833-N

DISCUSSION

The Food Packet, Individual, Combat, In-Flight, IF-4 (Figs. 9, 10, 11) was designed for passengers and crews of transport and bombardment-type aircraft on flights extending over one or more meals. Each food packet constitutes one meal, and consists of one can of fruit, one can of meat, a bread-type unit, a dessert unit, and an accessory packet. Ten different menus, each with subordinate variation, are assembled in separate containers. Their storage stability is approximately two years. Each menu was created to supply a fuel value of about 1200 calories. Critical evaluation during this study, however, has disclosed wide variation among certain menus in actual fulfillment of this specification. A review specifically concerned with the fuel aspect of the IF-4 Food Packet is available in Memorandum Report No. WCRDF-696-119, entitled Fuel Value of Individual, Combat, In-Flight Food Packet, IF-4, dated 6 November 1951. Information presented therein was gained through preliminary research incidental to preparation for this study.

The primary purpose of the work described in this report has been three-fold: (1) to determine the absolute and relative acceptability of individual menu items, (2) to investigate the effect, if any, of certain operational factors upon food preferences during flight and (3) to determine whether there is actually a direct relationship between an individual's expressed preference for a given item and his consumption of that item.

The facilities and personnel of eight Air Force bases drawn from seven major commands were utilized in supplying the data presented. Participating bases were Mitchel, Westover, Kindley, Fairchild, McChord, Hickam, Mather and Langley.

The replies of 1771 subjects who consumed one IF-4 packet, each, during flight, form the basis for the conclusions to be drawn from the data collected. As the various tables are examined which break down the replies and relate them quantitatively to selected criteria, the precision made possible by utilization of the punch-card technique of data analysis will become evident. The reply of every subject to each question has been registered and tabulated. The punch-card technique makes possible so accurate an accounting of individual replies that the omission of but one would be immediately obvious.

A space at the top of the IBM border (adjacent to the rating scale of the questionnaire) was set aside to code the menu upon which the subject expressed his opinion. The menu code consists of a four-digit number. The first digit indicates the fruit item, the second represents the meat-or-cheese item, the third indicates the dessert category, A, B or C, while the fourth digit refers to either the flavor of the starch-jelly disc reported upon by individuals who had dessert Unit-A, or whether pound cake, fruit cake or date pudding was drawn by individuals who had dessert Unit-C. Menu codes were assigned on the basis of the numbers

which appear opposite the menu items. Items preceded by the heavy vertical line on the rating scale are common to all menus comprised of categories under which the item appears. Such items, themselves, carry no individual code designation, since they accompany the coded category under which they are listed. Numbers used in the coding procedure appear opposite the respective item:

1 Pineapple
2 Fruit Cocktail
3 Peaches
4 Plums
5 Pears

0 Chicken
1 Hamburger
2 Beef and Pork Loaf
3 Cheese, Processed
4 Meat, Ground with Spaghetti
5 Beef and Corn
6 Ham and Eggs
7 Meat and Noodles
8 Beef Steak
9 Ham, Fried

1 Dessert Unit-A
- Cookie, Oatmeal-Chocolate Chip
- Cookie, Sandwich
- Chocolate Disc
- Starch-Jelly Disc
  - 1 Lemon
  - 2 Orange
  - 3 Cherry
  - 4 Licorice
  - 5 Lime

2 Dessert Unit-B
- Cookie, Oatmeal-Chocolate Chip
- Cookies, Sandwich

3 Dessert Unit-C
- 1 Pound Cake
- 2 Fruit Cake
- 3 Date Pudding

Crackers

Soluble Milk
Coffee
Tea
Sugar
Chewing Gum
Salt
Pepper

According to the Record of Nutritive Values, dated 30 August 1950, as amended, published bythe Quartermaster Food and Container Institute, an official description of content and variability of the items comprising the food packet under consideration, provision is made for ten principle, predetermined menus. This number can be considered greater only if one takes into account the various flavors of the starch-jelly disc which occurs in dessert unit-A. The flavor of the starch-jelly disc which is packed with any one menu is not controlled, except for the provision that different flavors be packed in equal numbers. The following group of code numbers, arranged in such manner as to separate the ten principle menus, represents all possible menus which were authorized in the IF-4 procurement. These menus, then, constitute what hereafter will be referred to as authorized. With them is included their caloric content, or what will be called calories available of the respective menu.

Menu Code	Caloric Content	Menu Code	Caloric Content
1211	1366	3620	1103
1212			
1213		3420	944
1214			
1215		5120	1100
1811		5331	1414
1812			
1813	1293	4932	1414
1814			
1815		4733	1159
2511			
2512			
2513	1180		
2514			
2514			
2515			
2011			
2012			
2013	1249		
2014			
2015			

As will be noted by reference to figure 12, and to table 4, 654 unauthorized menus were evaluated by the 1771 subjects who submitted complete reports. There is strong though presumptive evidence to indicate that these menus were created in the manufacture of the packet, and that replies of subjets relating to them are not, in the majority of instances, erroneous reports. There are several possible reasons for a subject's evaluation of an unauthorized menu: such menus may

Figure 12. Breakdown of Unauthorized Menus

Menu Code Number	Frequency	Menu Code Number	Frequency	Menu Code Number	Frequency	Menu Code Number	Frequency	Menu Code Number	Frequency	Menu Code Number	Frequency
1012	2	1711	1	2412	1	3115	2	3831	1	4531	1
1013	5	1712	1	2413	1	3120	8	3913	1	4532	1
1014	1	1713	4	2414	1	3211	2	3920	4	4533	3
1020	1	1714	2	2415	3	3212	1	3932	1	4614	1
1112	2	1715	2	2420	2	3213	1	4012	1	4631	1
1113	1	1731	1	2431	1	3215	2	4014	1	4633	11
1120	6	1820	8	2433	1	3220	18	4015	1	4712	1
1131	2	1833	2	2520	2	3315	1	4020	1	4713	3
1132	1	1913	1	2632	1	3320	1	4032	1	4714	1
1220	2	1932	6	2712	1	3331	3	4033	3	4720	3
1232	1	1933	2	2713	1	3332	1	4113	1	4731	3
1311	1	2020	8	2714	2	3411	2	4120	1	4732	10
1313	1	2031	1	2715	1	3412	2	4132	2	4813	1
1314	1	2032	1	2720	2	3413	11	4213	1	4814	1
1315	1	2033	1	2732	1	3414	3	4214	2	4815	1
1320	1	2111	2	2811	1	3415	2	4220	1	4820	1
1331	1	2112	4	2812	1	3431	2	4232	1	4831	1
1333	1	2113	5	2813	2	3512	2	4233	2	4832	3
1411	6	2114	6	2814	2	3513	3	4311	1	4833	2
1412	9	2115	4	2815	2	3520	5	4313	1	4912	1
1413	11	2120	3	2820	2	3532	2	4315	1	4913	1
1414	6	2131	1	2913	1	3614	1	4320	2	4915	1
1415	12	2211	1	2920	1	3631	1	4331	1	4920	4
1420	4	2212	2	2931	1	3712	4	4333	1	4931	1
1431	1	2213	4	2932	3	3713	5	4413	1	4933	3
1511	1	2214	1	3011	2	3714	1	4415	2	5015	2
1512	3	2215	1	3013	1	3715	3	4420	2	5020	1
1513	4	2220	2	3015	2	3720	112	4431	1	5031	2
1514	1	2312	1	3020	2	3731	2	4432	5	5112	3
1515	4	2315	1	3032	1	3732	3	4433	3	5113	6
1520	1	2320	2	3111	1	3733	1	4511	1	5114	3
1633	1	2331	1	3113	1	3814	2	4513	2	5115	4
1631	1	2332	2	3114	1	3820	4	4520	1	5131	4

Figure 12. -Continued

Breakdown of Unauthorized Menus

Menu Code Number	Frequency	Menu Code Number	Frequency	Menu Code Number	Frequency	Menu Code Number	Frequency	Menu Code Number	Frequency	Menu Code Number	Frequency
5132	4	5231	5	5332	2	5515	1	5714	1	5831	2
5133	3	5232	1	5333	1	5520	1	5715	1	5913	1
5211	1	5313	1	5415	1	5531	3	5720	6	5920	3
5213	1	5314	1	5420	4	5620	1	5731	4	5931	2
5215	1	5315	1	5431	3	5631	1	5733	2	5932	1
5220	8	5320	3	5514	1	5713	1	5820	3	5933	1

Unauthorized Menus, Total: 654

have been created by the manufacturer of the packet by non-compliance with packing specifications; by the exchange of menu items between subjects, each of whom may then have reported upon a unique combination; by failure of the technician to replace meat items, after heating, to the packets from which they were withdrawn. In addition, an error on the part of the subject must be considered whereby a mistaken identification of an item resulted in a correspondingly incorrect indication of what the menu contained. Lastly, an error upon the part of the key-punch operator in transcribing coded information into the IBM card might render apparent an unauthorized menu which in fact did not exist.

Examining each of these possibilities, one is strongly impressed by the evidence pointing to creation of unauthorized menus during manufacture. One unauthorized menu (code #3720, Fig. 12) was independently reported 112 times by as many different subjects. The possibility of a specific menu occurring with such frequency by chance is precluded when it is understood that 250 different menus can be created by random assembly of the various items comprising the IF-4 Food Packet. In support of poor compliance with packing specifications, it may also be cited that one authorized menu (#3620), which contained ham and eggs as the meat item, was reported to have occurred only 13 times during the course of the survey. If the occurrance of the ham-and-egg item, itself, is considered, exclusive of whether found in authorized or unauthorized combination, it will be seen (Table 1) that this item was reported only 33 times during the survey. Since all ten menus were to have been provided in equal numbers (two each per 20-packet case) it may be presumed that this item should have been reported in roughly 10% of the subject-replies, or approximately 177 times.

Further, it may be stated that, prior to placing the survey in the field, eight cases of IF-4 packets were examined; not one was found to contain the ham-and-egg item.

In the case of six other menus (Nos. 1413, 1415, 3220, 3413, 4633, 4732) the frequency with which they were reported makes highly suspicious any defense established to plead that they were created in the field. The basis for speculating upon the manner by which the remaining unauthorized menus were created is inconclusive.

A limited number of unauthorized menus was discovered at the Aero Medical Laboratory prior to the date when the survey was begun.

While it must be conceded that other possible causes, as already mentioned, may have played some part in the creation of so large a number of unauthorized menus, it is believed that their role was of minor importance. Subjects were warned by the technician that they were not to exchange items. The technician was encouraged to disqualify all questionnaires pertaining to menus created as a result of such practice. The technicians were carefully indoctrinated, with considerable emphasis placed on the necessity for returning heated meat items to the pre-numbered packets from which they had been removed. While no control was exercised over the subject to assure that he recognized the item eaten as such, and

that he correlated the item with its designation on the rating scale, the fact that each item was labeled to correspond exactly with its title appearing in the questionnaire would tend to keep such errors to a minimum. Finally, not one instance was uncovered during the analysis of the data to incriminate the key-punch operator for an error of any type. Such extreme accuracy exhibited by the skilled personnel who operate the machines used in punch-card coding attests to the value of this technique in analysis of survey data. Later, mention will be made of the many advantages gained through the employment of electronic computation.

By assigning numerical weights to each acceptability category of a seven-point scale, then multiplying the percent of subject replies in each category by the category weight, it is possible to assign an arbitrary value to each item indicative of its relative acceptability. By using the numbers 3,2,1,0, -1, -2 and -3 to weight the respective categories, an item might score 300 if 100% of subject replies pertaining to it were in the highest acceptability category. Conversely, an item might have -300 if 100% of the subject replies pertaining to it were in the lowest acceptability category. By this method, evaluation of the relative acceptability of each item of the IF-4 Food Packet was made. Scores of the respective items follow:

Fruit:		Meat:	
Pears	267	Chicken	262
Peaches	266	Beef Steak	236
Fruit Cocktail	259	Beef and Corn	228
Pineapple	255	Meat & Spaghetti	223
Plums	234	Ham, fried	222
		Meat and Noodles	206
		Hamburger	206
		Cheese, processed	179
		Ham and Eggs	175
		Beef & Pork Loaf	158

Dessert Unit-A		Dessert Unit-B	
Cookie, Oatmeal-Chocolate Chip	248	Cookie, Oatmeal-Chocolate Chip	248
Cookie, Sandwich	247	Cookie, Sandwich	247
Starch-Jelly Disc:			
Lemon	185		
Cherry	167	Dessert Unit-C	
Orange	164	Fruit Cake	235
Lime	155	Pound Cake	232
Licorice	142	Date Pudding	160
		Crackers	177

Accessory Packet	
Salt	254
Pepper	251
Chewing Gum	251
Sugar	251
Tea	227
Coffee	209
Soluble Milk	132

Remembering that a score of zero corresponds to the neutral point of the rating scale (neither like nor dislike), it will be seen that all items were rated within some degree of the "like" range. In the absolute sense, then, it may be said that the IF-4 Food Packet has shown rather well its over-all ability to meet acceptability requirements. Those items showing a relatively low rating can, of course, be profitably improved upon or replaced to increase further the appeal of the packet generally. Items which warrant critical review in future procurements are readily selected by their inferior showing. Most prominent among them are the soluble milk product, the licorice starch-jelly disc, beef and pork loaf, and the date-pudding item of dessert unit-C. The frequency with which certain items of the accessory packet were not tried raises serious doubt as to the propriety of including them. For example, 70.86% of the subjects did not use the soluble milk, 71.20% did not use tea, 71.60% of the subjects did not use salt, and 74.08% did not use pepper. It has been estimated that a saving of $9,000.00 could be realized by excluding the pepper item from a procurement of a million-and-a-half packets. On the basis of only 26% utilization of this item, the expenditure required to provide it with each menu appears difficult to justify.

The nature of such requirements as two-year stability under extreme climatic conditions, compactness made necessary by weight and space considerations, limitations imposed upon the design of menus for consumption at altitude, in addition to the usual nutritional aspects, should not be overlooked as factors which make inevitable certain compromises with the average American's conception of the ideal bill of fare. During the survey it became evident that a wide-spread prejudice to the detriment of canned rations exists among Air Force personnel. There is a strong preference for fresh, perishable items over the tinned variety. Such a preference might have been predicted simply on the basis of subjective opinion. The degree of acceptability intrinsic to a canned ration is difficult to measure unless the attitude of the evaluating body is formed by the same conditions which dictate the design of the ration. Usually, opinions relevant to ration items are expressed by individuals oriented to the availability of fresh, perishable foods, whose transient experience with foods created to meet combat or survival situations comes as a novelty. Unless an individual has been previously subject to such situations, it is probably difficult, if not impossible, for him to relate with due appreciation the advantages of stable ration items to such circumstances. As long as the availability of strawberries with cream and filet-mignon at the termination of a flight affects the point of reference from which the subject views the stable ration, we may be reasonably certain that the ration will never enjoy an advantage. Such statements are not meant to be a defense in behalf of the IF-4 Food Packet, for, in spite of these factors, the results of the study show conclusively that, as a whole, the packet stands up surprisingly well on its own merit. They are, rather, an attempt to point out the fact that stable rations in general will always hold a preferentially subordinate position as long as the specific conditions for which they were designed do not exist.

REVIEW OF TABULATED DATA

General Considerations:

Information presented under the title, Distribution of Preference (Table 1) shows, superficially, the scope of the survey and the overall distribution of subject replies among acceptability categories. Other tables are designed to show either how various influences affect the general picture of Table 1, or, how selected sub-populations have contributed to its content. In the computation of percentages found under the various acceptability categories, figures taken from the subtotal column have been used to form the denominators of the fractions from which the percentage figures are derived. This practice has excluded the incomplete and not-tried replies from the percentage calculations. In addition, Table 1 shows the percent which the subtotal represents of the total, thereby indicating the degree of completeness achieved in the rating of each item.

Where incomplete replies are cited in each table, they are classified as to the column in which they occur. The column number listed pertains to that of the IBM cards to which the original data was transcribed, and from which all tabulated data have been collated. Such strict accounting of each reply has made possible perfect precision in the classification of each subject's response. That such precision could be achieved within a permissible time, with the limited personnel allotted, and with so large a number of subjects by employment of other than machine technique is inconceivable.

Table 1, Distribution of Preference:

This table discloses the manner in which subjects rated each item of the IF-4 Food Packet. It gives the most comprehensive tabulation of survey replies. In addition to the relative acceptability of items, it reveals the frequency with which items and components occur. Items of the meat-or-cheese component are reported with bizarre frequencies. Since each item of the meat-or-cheese component might be expected to occur, as previously mentioned, in 10% of the 1771 subject replies, frequencies of 33 and 299 for the Ham-and-Egg and the Meat-and-Noodle items, respectively, again incriminate the assembly procedure used in manufacture of the packet. All fruit and dessert items, as well as dessert units, occur with a frequency within 6% of that to be expected from the packaging description of the Record of Nutritive Values, dated 30 August 1950. The items of the meat-or-cheese component are, therefore, the only ones subject to criticism in so far as relative frequencies are concerned.

Table 2, (A, B, C, D), Distribution of Preference by Bases:

Individual questionnaires were prenumbered in accord with the schedule shown in Figure 4. By selecting questionnaires bearing numbers

within the range assigned to a particular base, subpopulations were screened for separate study. Essentially, Table 2 subdivides the data of Table 1 into eight groups, each distinguished from the other by the base from which it was obtained. It appears in four parts, A, B, C, D to facilitate its inclusion within the dimensions of this report. An analysis of the acceptabilities expressed for identical items at each of the eight bases has been made to evaluate existing differences at specific significance levels. The reliability of the questionnaire and survey techniques come under close scrutiny here, for, by definition, if each were entirely reliable and used with groups of analogous composition under identical circumstances, we might expect the responses to be identical. Unfortunately, ideal conditions are impossible to attain in a study of this type, and, certainly, no attempt is made to shield either the composition of the questionnaire or the administration of the survey from criticism which might benefit future studies. Figure 14, Significant Differences between Acceptabilities at the Eight Participating Bases, which accompanies this review, tabulates the differences in acceptability in terms of their significance.

These data show that there are significant differences between bases in their acceptability rating of some of the foods. The significance of these differences increases when one considers groups of foods or all foods, since there was a tendency for certain bases (especially Fairchild and Westover) to give consistently high numerical ratings and others (Mitchel and Langley) to give consistently low numerical ratings. It has been suggested that a more intensive indoctrination of subjects as well as more control over factors such as the length of time since the last meal, might reduce the differences observed.

Table 3, Distribution of Authorized Menus:

Table 3 defines the 10 authorized menus in terms of menu code number, states the absolute frequency with which each was reported and expresses, percent-wise, the proportion each represents of both the subtotal and grand total numer of replies. The menu code number appears under the columnar heading, Authorized Sub-Menus. This breakdown clearly shows the paucity with which menu #5 was encountered. Each menu should comprise, theoretically, 10% of the subtotal figure (e.g., 10% of 1055). It will be noted that all but menu #5 closely approach such a figure. The menu code number 3620 represents a menu composed of peaches, ham and eggs, and dessert unit-B. As was shown earlier, the ham-and-egg item is responsible for the low frequency of this menu, since only the meat-or-cheese component contributes to the bizarre frequency seen here. The fruit items and dessert units have shown a predicted frequency in all menus.

Table 4, Distribution and Frequency of Unauthorized Menus:

Here is shown the number of unauthorized menus which occurred, with their various frequencies. The fact that one such menu occurred 112 times is convincing evidence that this menu (3720) was assembled in manufacture.

Any contention that this menu was created in the field is rendered untenable by virtue of the fact that its occurrence was independently reported from all but one base which participated in the survey. The frequencies with which these reports were received from the respective bases are as follows: Mitchel, 14; Westover, 15; Kindley, 15; Langley, 18; McChord, 14; Hickam, 15; Mather, 21. The likelihood of the same error being independently made by seven different groups of technicians is scarcely worthy of discussion. Code number 3720 represents a menu composed of peaches, meat and noodles, and dessert unit-B. The fuel content of such a menu (with other nonvariable constituents considered) is only 999 calories. The high incidence shown by this unauthorized menu has, therefore, served to reduce substantially the average caloric value of those food packets assembled under common procurement. Especially is this true when one considers that the authorized menu which it in effect replaces (3620) has a caloric content of 1103 calories. The lamentable frequency with which menu 3620 was encountered has already been discussed in conjunction with Table 3.

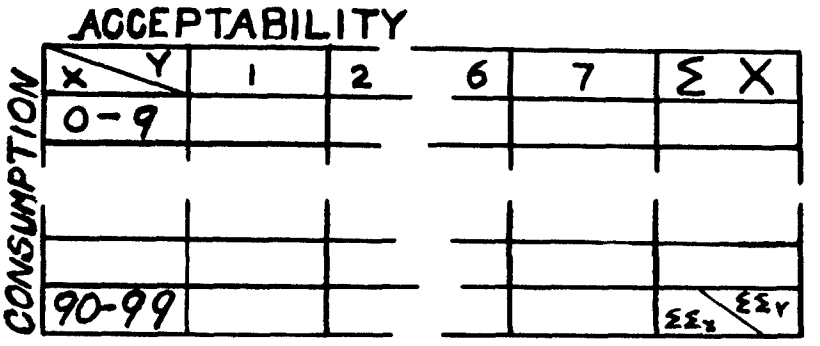
Two hundred and fifty menus may result from random combination of the various fruit items, meat items and dessert units of the IF-4 Food Packet. Since 10 of these constitute the authorized group, it follows that the remaining 240 comprise what has been labled the unauthorized group. It was found that among 654 occurrences of 240 unauthorized menus, there were 112 occurrences of a single unauthorized menu. The probability that this would occur purely by chance is 2.74×10^{-138}, so clearly, it is not due to chance. This particular menu appears to have resulted from the substitution of meat-and-noodles for ham-and-eggs of an authorized combination. Another unauthorized menu occurred 18 times. The probability that this would occur purely by chance is less than 2×10^{-10}. The probability that a single unauthorized menu would occur as many as 12 times, purely by chance, is less than 5.5×10^{-3}.

Another way of analyzing these data is to compare the probability of the observed distribution of occurrences with that of the most probable distribution; the probability of the observed distribution was compared with that of the Poisson approximation (a very rough approximation, indeed) of the most probable distribution. The ratio of the probability of the observed distribution to that of the Poisson approximation is 6.66×10^{-182}, and hence the ratio of the probability of the observed distribution to that of the most probable distribution is even smaller. Even if we eliminate the unauthorized menus which occurred 112 and 18 times, respectively, and consider only the 524 occurrences of the remaining 238 unauthorized menus, the evidence is quite overwhelming that something other than pure chance was operating. In this case, the ratio of the probability of the observed distribution to that of the Poisson approximation is 2.43×10^{-38}, hence the ratio of the probability of the observed distribution to that of the most probable distribution is still smaller.

Table 5, Relation of Consumption to Acceptability of Meat Items:

By reference to the following, the reader versed in statistics will be able to understand the method employed to establish the degree of

correlation exhibited by consumption and acceptability. In the accompanying illustration:



X = Consumption (percent)
Y = Acceptability rating (1 to 7)
$\bar{X}$ = Average consumption (percent) for group
$\bar{Y}$ = Average acceptability rating for group
r = Correlation coefficient between $\bar{X}$ and $\bar{Y}$
$s_{\bar{X}\cdot\bar{Y}}$ = Standard error of estimating $\bar{X}$ from $\bar{Y}$

First, one finds $\bar{X}$ and $\bar{Y}$ for each item. From the values of $\bar{X}$ and $\bar{Y}$ for the various items one finds that the equation of regression $\bar{X}$ on $\bar{Y}$ is:

(1) $$\bar{X} = 112.6 - 11.29\,\bar{Y}$$

the correlation coefficient between $\bar{X}$ and $\bar{Y}$ is:

(2) $$r = -.5171$$

and the standard error of estimating $\bar{X}$ from $\bar{Y}$ is:

(3) $$s_{\bar{X}\cdot\bar{Y}} = 8.73$$

To estimate the average consumption (percent), $\bar{X}$, of an item having an average acceptability rating, $\bar{Y}$, one substitutes $\bar{Y}$ in equation (1) and so finds $\bar{X}$. This estimate is subject to error, since the value of $\bar{X}$ is dependent upon other factors in addition to $\bar{Y}$. It should be noted that for 10 pairs of values of $\bar{X}$ and $\bar{Y}$, $r = -.5171$ is not significant even at the 5% level. Hence the regression equation is of little value in estimating the value of $\bar{X}$ from $\bar{Y}$. This is shown also, by comparing the standard error of estimate, $s_{\bar{X}\cdot\bar{Y}} = 8.73$ with the standard deviation $s_{\bar{X}} = 9.61$.

If one eliminates Processed Cheese and considers only the nine remaining meat items, the equation of regression of $\bar{X}$ on $\bar{Y}$ is:

(4) $$\bar{X} = 98.1 - 2.91\,\bar{Y},$$

the correlation coefficient between $\bar{X}$ and $\bar{Y}$ is:

(5) $$r = -.5083,$$

and the standard error of estimating $\bar{X}$ from $\bar{Y}$ is:

(6) $$s_{\bar{X}\cdot\bar{Y}} = 2.24$$

The much smaller standard error of estimate occurs because the standard deviation $s_{\bar{X}}$ is only 2.43, not because of any greater degree of relationship between $\bar{X}$ and $\bar{Y}$. The correlation coefficient, $r = -.5083$, for 9 pairs of values $\bar{X}$ and $\bar{Y}$ is still not significant, even at the 5% level.

Such lack of significance in the correlation coefficient when determined from the limited number of meat items prompted examination of all items used in the IF-4 Food Packet in the hope that more significant information might be obtained through such consideration. By use of the same method described, above, one finds that the equation of regression of $\bar{X}$ on $\bar{Y}$ is:

$$\bar{X} = 103.3 - 9.267\,\bar{Y}, \tag{7}$$

the correlation coefficient between $\bar{X}$ and $\bar{Y}$ is:

$$r = -.6086^{**}, \tag{8}$$

and the standard error of estimating $\bar{X}$ from $\bar{Y}$ is:

$$s_{\bar{X}\cdot\bar{Y}} = 6.96 \tag{9}$$

Again, to estimate the average consumption (percent), $\bar{X}$, of an item having an average acceptability rating, $\bar{Y}$, one substitutes $\bar{Y}$ in equation (7) above, and so finds $\bar{X}$. This estimate is, again, subject to error, since the value of $\bar{X}$ depends upon factors in addition to $\bar{Y}$. We can account for only a proportion r^2 (approximately 37%) of the variance in consumption on the basis of variability of the acceptability ratings. Assuming a normal distribution, the standard error of estimate (9) is the value below which about 68% of the errors of estimate would fall, while 95% of such errors would fall below 2 $s_{\bar{X}\cdot\bar{Y}}$. Thus, one would expect the estimated value of X to fall within 7 percentage points of the actual average consumption 68% of the time, and within 14 percentage points of it 95% of the time. The estimating equation (7) should be used only to estimate the <u>average</u> consumption of a group, not the consumption of an individual. Since the various bases studied showed significant differences in the acceptability ratings of some foods, it might be well to adjust the average acceptability rating for the particular base involved if one wishes to estimate average consumption at a single base.

On the basis of the degree of significance found by consideration of the entire complement of items used in assembly of the IF-4 menus, we may conclude that there is a direct relationship between acceptability and consumption.

Although determination of the significance level, the coefficient of correlation, and the standard error of estimate were made from tables identical in type to the one whose framework is illustrated at the beginning of this review, they have not been included in the report because

**Significant at the 1% level

of their length.

Table 5 shows the reader at a glance the type of distribution encountered in the meat-or-cheese component. Average amounts consumed are expressed in percent, and are based upon the quantity originally available to the subjects.

The fact that a direct correlation has been established makes it possible to predict more complete consumption with elevation of acceptability. Even though such a relationship might be expected, it is interesting to note that it has actually been observed in the course of this study.

Table 6, Consumption Versus Recommendation for Quantitative Alteration:

Except in the case of the Meat-or Cheese and Cracker components, the range in percent consumed of available calories between subjects recommending that the quantity of a component be increased and those recommending that such quantity be decreased is too small to encourage claims in behalf of its significance. Subjects who recommended increasing the quantity of a particular component did, however, consume more of what was available to them than did those who recommended a decrease in the quantity of the component. It is interesting to note the consistency with which this is evident in each of the five components tabulated. Actually, it is this consistency more than the difference in magnitude of the values determining it, which favors recognition of a direct relationship between recommendations for alteration of quantity and consumption. Definite knowledge of such a relationship will be helpful in simplifying the procedures necessary for the analysis of future surveys. Opinion concerning quantitative adequacy, as expressed by the subject, should warrant more serious consideration as a guide to the formulation of food-packet composition. The use of gravimetric data as a primary means of estimating quantitative adequacy may be supplanted, and its tedious and time-consuming disadvantages dispensed with, provided subject-expressed opinion can be regarded as significant and reliable. Applicability for the employment of subject opinion in lieu of gravimetric data as an indicator of quantitative adequacy must, in any event, depend upon the degree of precision desired, but for the determination of trends and values whose limits are not too refined, it would appear that an analysis of subject opinion may be sufficient.

In this study, the average difference in percent consumed of available calories between those subjects giving opposite recommendation for quantitative alteration is only 14.5%; such an amount applied to a menu of 1200 calories, however, would alter the fuel intake by 174 calories, a value considerably in excess of the caloric content found in any member of the fruit component. This means, then, that the subject who recommended an increase in his menu consumed, on an average, more than the equivalent of an additional can of fruit over the subject who wished his menu decreased in quantity.

Experience may show the relationship discussed here to be truly significant, and may lead to a basis from which the optimum quantity of a given item can be predicted. The opinions concerning quantitative alteration of cheese, appearing in Tables 13, 14 and 15, which will be reviewed later, are highly indicative of the need for quantitative adjustment if the premise that such opinions are valid predictors of consumption can be substantiated. It will be seen that additional evidence lends credence to such an argument.

Table 7, Subject Recommendation for Quantitative Alteration of Food Packet Components:

If certain entries are compared in this Table with those in Table 1, it may be concluded that there are discrepancies. It is advisable, therefore, that the source of these apparent contradictions be mentioned and their lack of influence upon the over-all accuracy of the data be emphasized. As one examines Table 7, the absence of a "not-tried" column is at once obvious, whereas in itemizing replies for Table 1, this category of reply was delineated. The absence of such replies in Table 7 due to the fact that where an individual did not try a member of one of the components, he, in most cases, left his quantitative recommendation blank. Because of this, such subjects were tabulated in the incomplete column. This in itself has not altered the subtotal number of replies upon which the percentage computation is based. One may then point to the fact that the sum of the not-tried entries (117) in the fruit component of Table 1 is greater than the number of incomplete entries (83) of Table 7, and inquire how this is possible in view of the above explanation, which should produce the opposite picture. The result is due to the fact that some subjects, even though they did not try a member of a given component, expressed an opinion as to how its quantity should be altered. Referring to the fruit component, again, it is evident that there were 34 subjects (117-83) who contributed such ill-warranted replies. The actual incomplete entries of Table 1 (4 as to fruit item and 4 as to preference) do not enter into consideration; since a subject omitted either his preference for a given fruit item, or his identification of specifically which one he was issued, it does not necessarily follow that he did not try one, nor that he is not entitled to recommend the manner in which its quantity should be altered.

Such practices, while undesirable, do not alter the relative accuracy of the data since the opportunity for subjects involved to recommend any one alternative of alteration is no greater, proportionately, than it would be for other qualified subjects to do likewise. And so it is that, while in the absolute sense Table 7 is slightly distorted (less than 2% in the case of the fruit component) it may be considered relatively accurate in its portrayal of the proportion of subjects submitting each recommendation. It is this proportionate relationship in which the study is primarily interested.

The fact that such a high percentage of individuals recommended no change in the quantity of the various components may be gratifying to the designers of this packet. However, there is some suggestion that the

cracker quantity may be excessive, since 24% of the subjects recommended that it be reduced. That the quantity of some member or members of the meat-or-cheese component may be insufficient is also open to question with roughly 12% of subjets recommending that there be an increase in the quantity of their particular member. Examination of Table 14 will disclose the relationship existing between recommendations of cracker quantity and the presence of cheese. This relationship it is believed accounts to a considerable degree for the picture seen, component-wise, in Table 7.

Recommendations for reduction in quantity of the accessory packet in Table 7, although somewhat prominent, are considered of interest only in the light of the economies which may possibly be effected through a closer examination of them. There is evidence to indicate that selective omission or reduction in quantity of certain items of the accessory packet is warranted.

It is believed that the remaining portions of Table 7 are indicative of an entirely satisfactory balance in the quantity of the other components.

Table 8, Time Since Last Meal Versus Preference for Quantitative Alteration:

Apparently, the interval between the time of the subject's last meal and his consumption of the food packet had little effect upon his attitude concerning the need for alteration of component quantity. It is surprising how closely the opinions of both groups (those who ate more than four hours previously and those who ate four or less hours previously) parallel each other.

Here, again, the data pertaining to the cracker component and the accessory packet reveal the same trend as noted in earlier review, namely, that each is regarded as being somewhat excessive in quantity by a considerable proportion of the subjects. In view of the large range in time between meals exhibited by members of the first group, their replies indicate that, even though they may have been quite hungry, the quantity of food provided in the IF-4 Food Packet was adequate. Had it not been so, one would have expected to find a large number of subjects who had eaten in excess of four hours previously making recommendations to increase the quantity of the various components.

The slight difference (about 3%) in the desire of the first group over the second to increase the quantity of the meat-or-cheese component remains the only suggestion of a difference between attitudes of the two groups. If this is an indication of a true difference in the attitudes of the groups, the difference is consistent with what one might expect, since those subjects belonging to the group which had not eaten for the longer period contributed the higher percentage of replies recommending an increase in the quantity of the meat-or-cheese component.

Table 9, Time and Size of Last Meal Versus Preference for Quantitative Alteration:

By considering subjects of Table 9 in accord with their choice of quantitative alteration (add-to, subtract-from, do-not-change) and determining what proportion of each group classified the size of its last meal as light, moderate or large, the following distribution has been obtained:

	Add to			Subtract from			Do Not Change		
Those who ate more than four hours previously:	Light %	Moderate %	Large %	Light %	Moderate %	Large %	Light %	Moderate %	Large %
Fruit	37.5	50.0	12.5	28.6	46.4	25.0	38.8	51.6	9.5
Meat-or-cheese	39.2	49.0	12.0	38.1	50.5	11.4	38.7	51.9	9.4
Desserts	27.0	62.5	10.4	28.9	54.2	16.9	39.8	50.5	9.7
Crackers	31.9	48.9	14.9	32.7	54.6	12.7	40.9	50.6	8.5
Accessory Packet	47.7	41.5	10.7	30.2	57.6	12.2	39.4	51.0	9.6
Average:	36.7	50.4	12.1	31.7	52.7	15.6	39.5	51.1	9.3
Those who ate four or fewer hours previously:									
Fruit	46.7	43.3	10.0	14.3	71.4	14.3	46.1	43.8	10.1
Meat-or-cheese	44.7	47.4	7.9	56.0	40.0	4.0	44.9	44.2	10.9
Desserts	54.5	36.4	9.1	35.7	46.4	17.9	46.3	43.4	10.3
Crackers	62.5	12.5	25.0	41.1	46.7	12.1	46.8	44.2	8.9
Accessory Packet	28.6	71.4	0.0	31.8	59.1	9.1	48.8	40.7	10.6
Average:	47.4	42.2	10.4	35.8	52.7	11.5	46.6	43.3	10.2

Since the review of Table 8 stated that the time of the last meal did not influence the subjects' recommendations in regard to component quantity, any trend shown here would of necessity be attributable to the size of such a meal. It can be seen from this tabulation that the size of the last meal, also, has not influenced subjects in their recommendations for alteration of component quantity.

Table 10, Relation of Time Since Last Meal and Consumption of Other than Food Packet Items to Preference for Quantitative Alteration:

Table 10 reveals the replies of subjects in accord with whether they had eaten more or less than four hours previous to the consumption of their food packet, whether they consumed items in addition to those provided in the packet, and how they recommended that component quantity be altered.

A portion of this Table is of no value because of the paucity of replies within that area. That part of the tabulation which includes the "add-to" and "subtract-from" columns of the group who ate other than ration items, and who ate four or fewer hours previously, are so considered, with one exception, namely, the entry pertaining to crackers in the "subtract from" column of the area defined.

It is interesting to note that the group which ate four or less hours previously, comprised but 24% of the entire number who reported upon the time interval. Actually, the average interval since the last meal was surprisingly large among the entire group of subjects. This has led to the suspicion that crews may frequently embark on missions without breakfast.

The preference for alteration of quantity was not affected by the time interval between the last prior meal and consumption of the IF-4 food packet. No trends can be recognized in the data of this Table.

The same suggestive prominance with regard to the meat-or-cheese and cracker components is seen again, as it has been in other tables, and recalls attention to the fact that a substantial number of subjects recommend an increase in the quantity of the meat-or-cheese component and a reduction in the quantity of the cracker component. This suggestion appears consistently, irrespective of the time since the last meal, or whether food supplementary to the food packet was involved.

Table 11, Relation of Time Since Last Meal to Component Preference:

Table 11 shows no consistent trend to imply any influence of time since last meal upon component preference. From these figures, we can only assume that the interval between the last meal and the time of consuming the food packet had no effect upon the acceptability of the various components.

Table 12, Consumption Related to Time Since Last Meal:

Time since the last meal is shown to have no effect upon average consumption. Why this should be true is a matter of speculation, but the evidence is supported in every Table of this study which considers the factor of time between meals. Apparently the primary influence upon consumption is acceptability. This may imply that few subjects in this survey were so famished as to disregard the acceptability factor. The review of Table 5 has proved acceptability to be a strong influence upon consumption. Under conditions of extreme hunger, time between meals may be a factor in consumption, but, even then, one study on survival[1] demonstrated that individuals are apt, voluntarily, to undergo serious nutritional depletion rather than protect themselves against such a state by consuming foods of low acceptability.

1/ AF Technical Report No. 6019, August, 1950, "Artic Field Trial of USAF Survival Rations, Blair Lake, Alaska, January, 1950" by Harry C. Dyme, Section VII, par 2, page 61.

In Table 12, as in several others, the percent consumed of available calories has been used as an index to consumption; so in the absolute sense, expression is in terms of the relative fuel intake rather than in the weight of items consumed. Since fuel intake has been determined from gravimetric data, it is believed that in the nutritional sense relative fuel intake is more revealing than would be an expression in terms of weight consumed alone.

Table 13, Cracker Consumption Related to the Presence of Cheese:

The higher consumption of crackers by those subjects who had cheese as compared to that of those who had other than cheese, while not great, is nevertheless thought to be indicative of a weakness in the assembly of the IF-4 menus. This impression is more easily justified when one reviews Tables 14 and 15, where very definite criticism by the subjects becomes apparent. The only statement tenable in reference to this particular review, is that those subjects who had cheese as a menu constituent consumed more crackers than those who had other protein items. Actually, the full picture indicates that both cheese and crackers were provided in excessive quantity, each considered in its own right, but that where cheese was a menu constituent, the cracker quantity was not as excessive as with the other protein items, since it apparently made consumption of so large a quantity of cheese less difficult.

Table 14, Relation of Cracker Quantity Recommendations to the Presence of Cheese:

Table 14 shows that a higher percentage of persons who did not have cheese as a menu constituent requested a decrease in the cracker component than did those who had cheese. This again serves as an indication that the cracker quantity is more excessive in the absence of cheese.

Table 15, Recommendations for Quantitative Alteration - Cheese Versus Meats:

Here we have evidence that the cheese item is, itself, excessive in quantity. Among those who had cheese, we find that 9.56% recommended an increase in the meat-or-cheese component (cheese) whereas 39.71% recommended a decrease in this component. However, among those who had other than cheese, 11.96% requested an increase, and only 5.63% suggested a decrease in quantity of the component. Although both cheese and crackers appear to be excessive in quantity, they each serve to provide a complementary requisite to more complete consumption of the other.

Table 16, Consumption of Crackers Related to Fluid Intake:

A trend is in evidence in Table 16 which may be nothing more than coincidence. A consistent increase in consumption may be noted accompanied by an increase in fluid intake. The two proceed to a point where satiation might be expected; beyond this point consumption declines abruptly. These figures are not published as a basis for specific

conclusions, for if they do have merit they are too few in number for an evaluation of their significance. The trend which they show is one compatible with what one might expect based upon purely subjective considerations, and seems, therefore, worth brief mention.

Table 17, Caloric Intake by Weight Group:

A glance at the figures of Table 17 will suffice to show that no relationship can be demonstrated between the weight group of the subjects and the amount of the food packet any such group may be expected to consume.

Table 18, Caloric Intake by Age Group:

Age, also, appears to have no affect upon consumption.

Table 19, Relative Acceptability of Meat Items to Passengers and Crew-Members:

If one averages the percent columns of Table 19, then compares the averages for one group with those of the other, he will find that whether a subject was a crewmember or a passenger his evaluation of acceptability showed no consistent differences from those of the other group.

This seems rather important, since it implies that persons other than crewmembers may be a source of data pertaining to acceptability of items intended for utilization by air crews. On the basis of data appearing in Table 19, and elsewhere in this report, there is every reason to believe that superimposing acceptability ratings of one group (passengers) upon the second (air crew) is a perfectly valid means of predicting acceptability in the second group.

Table 20, Component Preference Among Rated Personnel Based Upon Flying Time:

There is no evidence in these data to indicate that two groups of rated personnel isolated according to flying time, differed significantly from each other in their evaluation of the four components cited. To the contrary, differences which may be noted are small, arbitrary, inconsistent and show no discernible trend. We may conclude, therefore, that flying time is not a factor contributing to the acceptability of the food items with which this study is concerned.

Table 21, Distribution of Opinion Among Passengers and Crewmembers Concerning Roughness of Air During Flight:

Conditional with the qualification cited in the footnote to this Table, passengers were slightly more disposed to indicate roughness of air during flight than were crewmembers. Although the data are consistent in depicting the tendency of passengers to evaluate roughness of air more positively, the variation in opinion is small. There does,

however, appear to be a predisposition among passengers to regard the turbulence of what we have assumed to be representative air samples with increased subjective awareness relative to that which can be detected among crewmembers.

Table 22, Consumption on Smooth Versus Very Rough Flights:

Two extremes of turbulence were considered for their effect, if any, upon consumption. The implication from the data is a paradox of what one might expect. An indication that subjects consume more during flights in very rough air than when on flights in smooth air comes as a distinct surprise. No attempt is made to extend data of this occasion to universal applicability, for such an unexpected outcome demands further inquiry before generalizations can be justified.

Examination of Table 21 will show that the distribution of opinion among passengers and crewmembers regarding roughness of air during flight is not sufficiently wide-spread to permit indictment of it as a factor in producing the picture seen in Table 22. Any pronounced contrast in opinion on this subject by these two groups might be seized upon for an explanation if it could be shown that the relatively small number of "very rough" replies arose from a predominance of passenger as opposed to crewmember responses. Even if the former group were responsible for the majority of the "very rough" replies of Table 22, it can be seen from Table 21 that the difference in opinion as to roughness of air between the two groups is not large enough to appreciably modify the data of Table 22.

The real reasons for the picture seen in Table 22 are obscure. If excessive turbulence is shown to promote increased consumption in further studies, it may be worth the effort to determine (1) whether subjects sublimate their concern for stresses incidental to flight (turbulence) to preoccupation with other activities (eating), and (2) whether a subject type exists who demonstrates a positive correlation between his evaluation of the degree of stress and his tendency to consume additional food.

Data of Table 22, however, in present form, are indecisive.

Table 23, Consumption Related to Extremes of Environmental Temperature:

No significant difference was observed in consumption as related to technician-evaluated environmental temperature.

Table 24, Consumption as Affected by Items Supplementary to Food Packet:

As will be noted, relatively few subjects consumed supplementary items. Effort was made to keep such practice to a minimum. The portion of the questionnaire which solicited the information for this table was inserted for measuring the extent to which prohibition of supplementary consumption was violated. In spite of precautions, the violation rate was 11%. The difference in packet consumption observed between those who did and those who did not consume supplementary items was only 2%; this is not considered significant.

Table 25, Availability of Water During Flight:

Water is shown to have been readily available on most flights. Since additional hot water for preparation of coffee and tea was taken aboard all aircraft, this tabulation refers only to cold drinking water. When incomplete replies are withdrawn from consideration, 6.4% of the subjects stated that water was not readily available. It is likely that personnel in remote crew positions contributed the bulk of such replies.

Regardless of the availability of cold drinking water, the fact that water contained in other beverages, though hot, was always available, precludes an affect upon consumption because of the lack of complementary fluid intake.

Table 26, Consumption Related to Fluid Intake:

It is interesting to compare this Table with Table 16 and to note the completely analogous picture the two present. Except for mention of the magnitude of the individual values, the review of Table 16 might be applied directly to Table 26. The degree to which one reinforces the other lends creditability to the individual significance of each.

It appears quite definite that food consumption declines as fluid intake exceeds a critical level; but, also, within appropriate limits, fluids enhance the likelihood for increased food consumption. It is probable that these facts are related through the ability of fluids, in excessive quantity, to limit food intake by virtue of the volume they displace, yielding to a feeling of fullness or distension, whereas, taken conservatively, they constitute an aid to mastication.

Table 27, Frequency with Which Various Fluids Were Consumed:

Coffee was consumed most frequently both before and with the food packet. The frequency with which it was selected at a time when free choice of other beverages was feasible, emphasizes the wide-spread approval inherent in this item.

Prior to consumption of the packet, when free choice of all beverages prevailed, it can be seen that subjects selected water with the second greatest frequency. During consumption of the packet, however, when availability of beverages other than those provided in the packet was very limited, tea became the beverage consumed with second greatest frequency. Consumption of water, per se, under these conditions dropped 50% from what it had been when choice of beverage was relatively unrestricted.

Frequencies with which other beverages were consumed, both before the packet and with the packet, were very small and do not deserve serious reflection.

It may be said in generalizing that coffee is the beverage selected with greatest frequency whether or not the subject consumes it with his meal. Water is most frequently consumed in the absence of coffee and tea;

where both tea and water are available with the meal, tea is selected over water by a ratio of three to one. Other beverages were not as readily available with the meal as at other times because they were not a part of the packet; so, while no effort is made to compare their relative merit, it may be said that with the meal, or prior to it, they have but small import in the light of the preference shown for coffee, tea and water.

Table 28, Utilization of IF-4 Tea and/or Coffee Items:

Fifteen percent more coffee than tea was used in the preparation of beverages from the IF-4 packet. This finding is in accord with data in Table 27, which show coffee to be the beverage most frequently consumed.

Table 29, Consumption of Coffee in Hot Versus Cold Environment:

A greater percentage of subjects comprising the hot-environment group consumed coffee, than did those making up the cold-environment group. This, of course, is counter to what one might expect. However, it is entirely possible that sufficient tea was utilized by the cold-environment group to render more conventional the apparent idiosyncracies of the data in Table 29. The degree to which consumption of tea might influence the picture is unknown since its effect has not been tabulated.

No conclusions may be drawn from the distribution of replies in Table 29, in so far as the effect of thermal environment upon the demand for hot beverages is concerned, because only coffee is considered. The part tea, another hot beverage, may have played in altering the picture presented by coffee, alone, is not revealed. It seems probable, however, that the role of tea, considered simultaneously, would produce a more conventional and predictable outcome relevant to the effect of environmental temperature upon the demand for hot beverages. Extension of the data presented in Table 29, to include the demand for the hot beverages, in general, under differing thermal environments, is not warranted.

Table 30, Relation of Fluid Intake to Temperature and Humidity:

The paucity of replies seen in this Table results from the fact that few subjects categorized their environment within the extreme groups used as criteria for the tabulation. Environmental choices as to temperature were hot, comfortable, and cold, whereas those relating to humidity were dry, normal, and moist. The extremes were used as criteria, namely, hot and dry as opposed to cold and moist. Very few subjects indicated such extremes of environment.

The reliability of Table 30, as a result of the foregoing, is without defense. No consistent trends can be observed, but even if in evidence, they would be insignificant because of the scarcity of replies contributing to them.

Table 31, Difficulty in Opening Cans:

In view of the fact that 95% of the subjects denied difficulty in opening cans, no problem in the operation of the packet can-opener is indicated.

Table 32, Ranks and Grades of Personnel Surveyed:

The distribution of ranks and grades encountered is believed to be representative in cross-section of their Air Force-wide distribution. That this should obtain was an objective of early planning.

Table 33, Types of Aircraft Encountered:

Combat-type aircraft were not utilized by survey technicians to the degree anticipated during the planning phases of the study. The total absence of B-36 reports is the result of several factors which complicated efforts to include them. Security restrictions were severe, causing uncertainty and delay in establishing procedures for implementation of the survey within their framework. Many flights were intercontinental, posing serious threats to the return of survey personnel. Others were of such prolonged duration as to tax the technicians' ability to secure the required volume of data within specified time limits. Requirements such as high-altitude indoctrination for non-rated personnel, on temporary flying status, totally unfamiliar with the procedures of such flights, placed the cap stone upon the accumulation of prohibiting complications. Had it been possible to circumvent these many obstacles within the time allowed, it is doubtful whether the information gained for the purpose of the study, would have been of such moment as to greatly enhance the value of this report.

The large number of replies originating on C-97 type aircraft is a result of the extensive use made of this carrier on flights from Hawaii to Japan by MATS and the impressive capacity of the aircraft for passenger transport.

SUMMARY

The Food Packet, Individual, Combat, In-Flight (IF-4), was given to 1771 subjects during flight, and they were asked to complete a questionnaire pertaining to it. Data were obtained at eight United States Air Force bases, Mitchel, Westover, Kindley, Fairchild, McChord, Hickam, Mather and Langley. Analysis of raw data was accomplished by means of the IBM punch-card technique.

A wide-spread predjudice to the detriment of canned rations was detected among Air Force personnel. In spite of this, the Food Packet, Individual, Combat, In-Flight (IF-4), achieved an over-all acceptability rating which serves to commend the packet in its present form and to encourage an optimistic view of its potential appeal under judicious and selective improvement. Inferior ratings were relative, only, since no item was rated in any degree of the dislike category.

Considerable criticism has been directed, in this report, at the method employed in the assembly of the various menus. This results from the frequency with which unauthorized menus were encountered. Items of the meat-or-cheese component, which were found with bizarre frequency are largely responsible for the prevalence of such unauthorized combinations.

Significant differences between bases in their acceptability ratings of some foods were found. The reasons for such differences are obscure.

It has been established that a direct correlation exists between acceptability and consumption.

Subjects who recommended an increase in the quantity of a particular component consumed more of what was available to them than did those who recommended a decrease in the quantity of the component. This suggests that the use of gravimetric data for the purpose of determining quantitative adequacy may be supplanted by subject-expressed opinion of such adequacy. However, more evidence is required to determine, with certainty, whether subject-expressed opinion is sufficiently reliable to justify its exclusive use in such measurement.

Considered independently, both crackers and cheese were found provided in excessive quantity for many subjects. Where these items occurred together in the same menu, each appeared to serve as a means of disposing of the other, so the degree to which they were provided in excess under these circumstances diminished.

Selective omission, or reduction in quantity, of certain items comprising the accessory packet is definitely indicated.

Neither the interval between the time of the subject's last meal and his consumption of the food packet, nor the size of his last meal, influenced his recommendations for alteration of component quantity. The presence of cheese, however, invariably brought forth a

recommendation for a decrease in the quantity of the component of which it is a member.

No difference in the acceptability evaluation (component preference) of subjects considered by reference to the time since last meal, amount of flying time possessed, or whether passenger or crewmember, could be detected when compared to such evaluations by all subjects. The complete lack of differentiation between packet acceptability to passengers and crewmembers suggests that either group might be used for survey purposes indiscriminately. The in-flight requirement would, of course, necessarily apply to both groups.

Such factors as time since last meal, roughness of air during flight, extremes of climatic environment, and consumption of supplementary food items, all evaluated by either the subject or the technician, were not shown to have any significant effect upon consumption. Different weight and age groups showed no significant variation in consumption. Consumption has been shown to be affected, primarily, by acceptability and to a lesser degree by fluid intake, assuming of course, a reasonable degree of desire for food exists with the subject. The threshold, where satiation for further intake of food is reached, can be lowered by increasing the fluid intake. However, fluids, within conservative limits, enhance the likelihood for increased consumption of food.

Coffee was the beverage consumed with greatest frequency, whether or not in conjunction with the subject's meal. Where choice of beverage was unrestricted, water was consumed with second greatest frequency. Where beverages were restricted to coffee, tea and water, they were consumed with a frequency in respect to the order in which mentioned.

The can opener provided with the packet is eminently satisfactory.

The following is submitted as a guide for revision of specifications to be used in procurement of items for the Food Packet, Individual, Combat, In-Flight. Conclusive justification for each can be found in the survey data.

1. Replace Beef and Pork Loaf with a meat product of greater appeal.

2. Delete salt and pepper from the accessory packet.

3. Replace present soluble milk product with Pream, or a product possessing equivalent properties.

4. Give priority consideration to the replacement of the Date Pudding item in any action contemplated to improve acceptability of the dessert group.

5. Replace Dessert Unit-A in its entirety with a Pecan Sweet Roll.

6. If found desirable to replace any member of the fruit group, it is suggested that Plums be given first consideration for deletion.

7. Replace Processed Cheese as a principle protein item.

8. Delete two crackers and replace them with an equivalent volume of processed cheese, leaving three crackers and the accompanying cheese, individually wrapped, as a distinct unit in one can.

9. Reduce the salt content of the fried-ham item.

10. Implement more precise methods of controlling the assembly of predetermined menus.

In addition to the above, such measures as increasing the number of meat and fruit items and expanding the present menu variety are expected to yield the most acceptable Food Packet of the series, to date.

TABLE 1
DISTRIBUTION OF PREFERENCE

	LIKE VERY MUCH	PERCENT	LIKE MODERATELY	PERCENT	LIKE SLIGHTLY	PERCENT	NEITHER LIKE NOR DISLIKE	PERCENT	DISLIKE SLIGHTLY	PERCENT	DISLIKE MODERATELY	PERCENT	DISLIKE VERY MUCH	PERCENT	SUB-TOTAL *	PERCENT	PREFERENCE INCOMPLETE	PERCENT	NOT TRIED	PERCENT	TOTAL
																	(COL. 41)				
PINEAPPLE	234	68.22	77	22.45	18	5.25	6	1.75	6	1.75	0	0.00	2	0.58	343	93.72	1	0.27	22	6.01	366
FRUIT COCKTAIL	242	69.14	85	24.29	11	3.14	7	2.00	1	0.29	1	0.29	3	0.86	350	94.59	1	0.27	19	5.14	370
PEACHES	249	72.38	80	23.26	8	2.33	7	2.03	0	0.00	0	0.00	0	0.00	344	96.36	0	0.00	13	3.64	357
PLUMS	162	53.82	93	30.90	32	10.63	10	3.32	3	1.00	0	0.00	1	0.33	301	86.74	1	0.29	45	12.97	347
PEARS	229	74.35	62	20.13	10	3.25	6	1.95	0	0.00	0	0.00	1	0.32	308	94.19	1	0.31	18	5.50	327
																	INCOMPLETE AS TO FRUIT ITEM (COL. 37):				4
																			GRAND TOTAL:		1771
CHICKEN	136	75.51	34	18.38	9	4.88	4	2.16	1	0.54	1	0.54	0	0.00	185	98.93	2	1.07	0	0.00	187
HAMBURGER	93	46.73	58	29.15	13	7.54	9	4.52	13	6.53	5	2.51	6	3.02	199	99.00	2	1.00	0	0.00	201
BEEF & PORK LOAF	44	28.21	47	30.13	20	12.82	12	7.69	12	7.69	12	7.69	9	5.77	156	97.50	2	1.25	2	1.25	160
CHEESE, PROCESSED	48	35.38	38	29.23	19	14.62	7	5.38	5	1.54	6	4.62	12	9.23	130	93.53	0	0.00	9	6.47	139
MEAT, GROUND WITH SPAGHETTI	104	48.60	75	35.05	16	7.48	11	5.14	4	1.87	2	0.93	2	0.93	214	100.00	0	0.00	0	0.00	214
BEEF & CORN	86	48.31	69	38.76	10	5.62	5	2.81	4	2.25	3	1.69	1	0.56	178	98.34	2	1.10	1	0.55	181
HAM & EGGS	9	28.13	13	40.63	3	9.38	4	12.50	0	0.00	3	9.38	0	0.00	32	96.97	0	0.00	1	3.13	33
MEAT & NOODLES	124	42.18	101	34.35	32	10.88	16	5.44	10	3.40	3	1.02	8	2.72	294	98.33	0	0.00	5	2.51	299
BEEF STEAK	101	57.71	47	26.86	16	9.14	4	2.29	6	3.43	0	0.00	1	0.57	175	97.77	2	1.12	2	1.12	179
HAM, FRIED	86	50.29	53	30.99	15	8.77	7	4.09	6	3.51	1	0.58	3	1.75	171	98.28	0	0.00	3	1.72	174
																	INCOMPLETE AS TO MEAT ITEM (COL(38):				4
																			GRAND TOTAL:		1771
COOKIE, OATMEAL-CHOCOLATE CHIP																	(COL. 43)				
DESSERT UNIT - A	445	63.66	178	25.46	48	6.87	18	2.58	4	0.57	4	0.57	2	0.29	699	88.15	24	3.03	70	8.83	793
DESSERT UNIT - B	255	62.04	106	26.28	32	7.79	14	3.41	1	0.24	1	0.24	0	0.00	411	86.71	21	4.43	42	8.86	474
	700	63.06	286	25.77	80	7.21	32	2.88	5	0.45	5	0.45	2	0.18	1110	87.61	45	3.55	112	8.84	1267
COOKIE, SANDWICH																	(COL. 44)				
DESSERT UNIT - A	438	62.91	179	25.83	41	5.92	20	2.89	10	1.44	4	0.58	3	0.43	693	87.39	28	3.53	72	9.08	793
DESSERT UNIT - B	254	62.25	113	27.70	25	6.13	13	3.19	2	0.49	1	0.25	0	0.00	408	86.08	29	6.12	37	7.81	474
	690	62.67	292	26.52	66	5.99	33	3.00	12	1.09	5	0.45	3	0.27	1101	86.90	57	4.50	109	8.60	1267
CHOCOLATE DISC	350	53.27	144	21.92	78	11.87	41	6.24	13	1.98	15	2.28	16	2.44	657	82.85	(COL. 45) 29	3.66	107	13.49	793
STARCH-JELLY DISC																	(COL. 46)				
LEMON	18	46.15	6	15.38	6	15.38	6	15.38	2	5.13	1	2.56	0	0.00	39	60.94	3	4.69	22	34.38	64
ORANGE	26	26.80	33	34.02	15	15.46	11	11.34	2	2.06	1	1.03	9	9.28	97	83.62	7	6.03	12	10.34	116
CHERRY	59	35.20	36	22.09	23	14.11	24	14.72	7	4.29	7	4.29	7	4.29	163	76.53	6	2.82	44	20.66	213
LICORICE	31	27.68	26	23.21	14	12.50	13	11.61	6	5.36	8	7.14	14	12.50	112	73.68	4	2.63	36	23.68	152
LIME	46	30.26	40	26.32	17	11.18	21	13.82	9	5.92	10	6.58	9	5.92	152	79.17	6	3.13	34	17.71	192
																	INCOMPLETE AS TO STARCH-JELLY ITEM (COL. 40):				58
																			GRAND TOTAL:		793
POUND CAKE	91	63.19	25	17.36	11	7.64	8	5.56	6	4.17	1	0.69	2	1.39	144	91.14	(COL. 47) 1	0.63	13	8.23	158
FRUIT CAKE	106	64.63	30	18.29	8	4.88	7	4.27	6	3.66	2	1.22	5	3.05	164	86.77	2	1.06	23	12.17	189
DATE PUDDING	39	30.95	33	26.19	18	14.29	9	7.14	9	7.14	7	5.56	11	8.73	126	82.89	1	0.66	25	15.82	152
																	INCOMPLETE AS TO ITEM (COL. 40):				1
																			GRAND TOTAL:		500

BREAKDOWN OF DESSERT UNITS (ABOVE):

DESSERT UNIT A	793	44.68 % OF COMPLETED DESSERT UNITS
DESSERT UNIT B	474	26.83 % OF COMPLETED DESSERT UNITS
DESSERT UNIT C	500	28.30 % OF COMPLETED DESSERT UNITS
INCOMPLETE AS TO DESSERT UNIT (COL. 39)	4	
GRAND TOTAL	1771	100.00%

CRACKERS	517	32.25	535	33.37	210	13.10	183	11.42	81	5.05	42	2.62	35	2.18	1603	90.51	(COL. 48) 33	1.86	135	7.62	1771
SOLUBLE MILK	114	23.51	116	23.92	65	13.40	59	12.16	43	8.87	20	4.12	68	14.02	485	27.39	(COL. 49) 31	1.75	1255	70.86	1771
COFFEE	367	48.93	193	25.73	78	10.40	39	5.20	26	3.47	16	2.13	31	4.13	750	42.35	(COL. 50) 26	1.47	995	56.18	1771
TEA	271	55.99	115	23.76	57	11.78	18	3.72	9	1.86	4	0.83	10	2.07	484	27.33	(COL. 51) 26	1.47	1261	71.20	1771
SUGAR	560	71.34	120	15.29	47	5.99	48	6.11	3	0.38	3	0.38	4	0.51	785	44.33	(COL. 52) 43	2.43	943	53.25	1771
CHEWING GUM	831	67.78	255	20.80	77	6.28	53	4.32	5	0.41	2	0.16	3	0.24	1226	69.23	(COL. 53) 33	1.86	512	28.91	1771
SALT	338	70.59	90	18.91	20	4.20	26	5.46	0	0.00	0	0.00	4	0.84	476	26.88	(COL. 54) 27	1.52	268	71.60	1771
PEPPER	308	70.83	73	16.90	22	5.09	28	6.48	0	0.00	1	0.23	2	0.46	432	24.39	(COL. 55) 27	1.52	1312	71.08	1771

* SUB-TOTAL CONSISTS OF TOTAL MINUS THE SUM OF "NOT TRIED" AND "INCOMPLETE"

FIGURE 13

SIGNIFICANT DIFFERENCES BETWEEN ACCEPTABILITY AT THE EIGHT PARTICIPATING BASES

Seven point scale: Like very much (1).....Dislike very much (7)

MEAN ACCEPTABILITY RATINGS

	Mitchel	Westover	Kindley	Langley	Fairchild	McChord	Hickam	Mather	Average	F
CHICKEN	1.300	1.556	1.333	1.364	1.533	1.292	1.433	1.250	1.384	.46
HAMBURGER	2.000	2.000	2.400	1.667	3.300	2.176	2.250	1.633	2.146	3.07**
B. & P. LOAF	2.765	2.444	2.429	2.615	4.066	2.357	2.435	2.700	2.827	2.68*
CHEESE, FR.	1.409	3.000	3.500	3.545	2.500	1.385	2.773	3.111	2.592	3.64**
MEAT w. SPAG.	1.724	1.970	1.763	1.763	2.000	2.208	2.312	1.457	1.832	1.50
BEEF & CORN	1.409	2.269	1.600	1.739	2.067	1.526	1.800	1.913	1.792	.47
MEAT & NOODLES	1.956	2.143	2.488	1.714	-----	2.000	2.083	2.137	2.075	1.21
HAM & EGGS	-----	-----	-----	-----	2.438	-----	-----	-----	-----	-----
BEEF STEAK	1.708	1.667	1.893	1.280	1.933	1.550	1.810	1.762	1.691	.90
HAM, FRIED	1.560	2.125	2.038	1.625	2.667	1.350	2.143	1.708	1.883	2.13
PINEAPPLE	1.186	1.540	1.685	1.500	1.406	1.485	1.341	1.660	1.487	1.48
FR. COCKTAIL	1.176	1.578	1.380	1.600	1.346	1.371	1.554	1.511	1.443	1.28
PEACHES	1.196	1.341	1.347	1.264	1.343	1.300	1.690	1.375	1.340	1.82
PLUMS	1.435	1.730	1.892	1.571	1.708	1.632	1.622	1.925	1.681	1.29
PEARS	1.128	1.371	1.342	1.065	1.567	1.485	1.477	1.360	1.344	2.20*
CO-CC (A)	1.411	1.828	1.542	1.346	1.786	1.451	1.475	1.505	1.538	3.11**
CO-CC (B)	1.514	1.439	1.375	1.358	2.079	1.920	1.378	1.446	1.543	2.92**
COOKIE, S. (A)	1.290	1.844	1.515	1.390	1.782	1.667	1.525	1.708	1.576	3.52**
COOKIE, S. (B)	1.414	1.357	1.339	1.375	1.973	2.022	1.487	1.475	1.527	5.58**
CHOC. DISK	1.912	2.118	2.010	1.658	2.082	1.844	1.862	2.345	1.983	1.73
POUND CAKE	1.750	1.556	1.625	1.353	2.923	1.533	1.600	2.040	1.778	2.15*
FRUIT CAKE	1.364	2.040	2.120	2.000	1.538	1.000	2.056	2.091	1.799	1.78
DATE PUDDING	2.688	3.000	2.500	3.190	3.833	2.059	2.714	2.800	2.849	1.02
8 MEATS†	1.701	2.074	2.034	1.793	2.784	1.715	2.082	1.882	1.982	9.74**
5 FRUITS	1.233	1.512	1.522	1.408	1.463	1.453	1.524	1.552	1.456	3.39**
8 DESSERTS	1.546	1.861	1.642	1.546	2.037	1.713	1.638	1.806	1.707	8.14**
21 FOODS	1.498	1.821	1.699	1.563	2.053	1.645	1.708	1.755	1.703	16.01**

* Significant at 5% level
** Significant at 1% level
† Meat & Noodles and Ham & Eggs excluded

TABLE 2A

DISTRIBUTION OF PREFERENCE BY BASES

		Like Very Much	Percent	Like Moderately	Percent	Like Slightly	Percent	Neither Like nor Dislike	Percent	Dislike Slightly	Percent	Dislike Moderately	Percent	Dislike Very Much	Percent	Sub-Total	Preference Incomplete	Not Tried	Total	Grand Tots
Pineapple:																				
	Mitchel:	36	83.72	6	13.95	1	2.33	0	0.00	0	0.00	0	0.00	0	0.00	43	0	6	49	
	Westover:	31	62.00	12	24.00	6	12.00	1	2.00	0	0.00	0	0.00	0	0.00	50	1	4	55	
	Kindley:	30	55.56	18	33.33	2	3.70	1	1.85	3	5.56	0	0.00	0	0.00	54	0	2	56	
	Langley:	26	65.00	11	27.50	1	2.50	1	2.50	1	2.50	0	0.00	0	0.00	40	0	2	42	
	Fairchild:	23	71.88	6	18.75	2	6.25	1	3.13	0	0.00	0	0.00	0	0.00	32	0	1	33	
	McChord:	24	72.73	6	18.18	2	6.06	0	0.00	0	0.00	0	0.00	1	3.03	33	0	0	33	
	Hickam:	36	81.82	5	11.36	0	0.00	2	4.55	1	2.27	0	0.00	0	0.00	44	0	4	48	
	Mather:	28	59.57	13	27.66	4	8.51	0	0.00	1	2.13	0	0.00	1	2.13	47	0	3	50	
																343	1	22	366	366
Fruit Cocktail:																				
	Mitchel:	45	88.22	4	7.84	1	1.96	1	1.96	0	0.00	0	0.00	0	0.00	51	0	2	53	
	Westover:	26	57.78	15	33.33	2	4.44	1	2.22	1	2.22	0	0.00	0	0.00	45	1	2	48	
	Kindley:	33	66.00	15	30.00	2	4.00	0	0.00	0	0.00	0	0.00	0	0.00	50	0	5	55	
	Langley:	23	57.50	12	30.00	3	7.50	2	5.00	0	0.00	0	0.00	0	0.00	40	0	0	40	
	Fairchild:	22	84.62	3	11.54	0	0.00	0	0.00	0	0.00	0	0.00	1	3.85	26	0	1	27	
	McChord:	23	65.71	11	31.43	1	2.86	0	0.00	0	0.00	0	0.00	0	0.00	35	0	2	37	
	Hickam:	38	67.86	13	23.21	2	3.57	1	1.79	0	0.00	1	1.79	1	1.79	56	0	4	60	
	Mather:	32	68.09	12	25.53	0	0.00	2	4.26	0	0.00	0	0.00	1	2.13	47	0	3	50	
																350	1	19	370	370
Peaches:																				
	Mitchel:	38	82.61	7	15.22	1	2.17	0	0.00	0	0.00	0	0.00	0	0.00	46	0	1	47	
	Westover:	33	75.00	8	18.18	2	4.55	1	2.27	0	0.00	0	0.00	0	0.00	44	0	2	46	
	Kindley:	36	73.47	10	20.41	2	4.08	1	2.04	0	0.00	0	0.00	0	0.00	49	0	2	51	
	Langley:	42	79.25	9	16.98	1	1.89	1	1.89	0	0.00	0	0.00	0	0.00	53	0	3	56	
	Fairchild:	23	65.71	12	34.29	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	35	0	3	38	
	McChord:	28	70.00	12	30.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	40	0	0	40	
	Hickam:	15	51.72	10	34.48	2	6.90	2	6.90	0	0.00	0	0.00	0	0.00	29	0	1	30	
	Mather:	34	70.83	12	25.00	0	0.00	2	4.17	0	0.00	0	0.00	0	0.00	48	0	1	49	
																344	0	13	357	357
Plums:																				
	Mitchel:	28	60.87	16	34.78	2	4.35	0	0.00	0	0.00	0	0.00	0	0.00	46	0	8	54	
	Westover:	20	54.05	11	29.73	3	8.11	2	5.41	1	2.70	0	0.00	0	0.00	37	0	10	47	
	Kindley:	15	40.54	15	40.54	4	10.81	2	5.41	1	2.70	0	0.00	0	0.00	37	0	7	44	
	Langley:	24	57.14	12	28.57	6	14.29	0	0.00	0	0.00	0	0.00	0	0.00	42	0	1	43	
	Fairchild:	16	66.67	4	16.67	2	8.33	1	4.17	0	0.00	0	0.00	1	4.17	24	0	5	29	
	McChord:	21	55.26	11	28.95	5	13.16	1	2.63	0	0.00	0	0.00	0	0.00	38	0	6	44	
	Hickam:	20	54.05	13	35.14	2	5.41	2	5.41	0	0.00	0	0.00	0	0.00	37	0	2	39	
	Mather:	18	45.00	11	27.50	8	20.00	2	5.00	1	2.50	0	0.00	0	0.00	40	1	6	47	
																301	1	45	347	347
Pears:																				
	Mitchel:	42	89.36	4	8.51	1	2.13	0	0.00	0	0.00	0	0.00	0	0.00	47	0	0	47	
	Westover:	24	68.57	10	28.57	0	0.00	1	2.86	0	0.00	0	0.00	0	0.00	35	1	3	39	
	Kindley:	28	73.68	8	21.05	1	2.63	1	2.63	0	0.00	0	0.00	0	0.00	38	0	4	42	
	Langley:	29	93.55	2	6.45	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	31	0	1	32	
	Fairchild:	22	73.34	4	13.34	2	6.67	1	3.33	0	0.00	0	0.00	1	3.33	30	0	3	33	
	McChord:	21	63.64	9	27.27	2	6.06	1	3.03	0	0.00	0	0.00	0	0.00	33	0	2	35	
	Hickam:	29	65.91	11	25.00	2	4.55	2	4.55	0	0.00	0	0.00	0	0.00	44	0	3	47	
	Mather:	34	68.00	14	28.00	2	4.00	0	0.00	0	0.00	0	0.00	0	0.00	50	0	2	52	
																308	1	18	327	327
																	Incomplete, Column 37:			1
																				1773

TABLE 28

DISTRIBUTION OF PREFERENCE BY BASES

		Like Very Much	Percent	Like Moderately	Percent	Like Slightly	Percent	Neither Like nor Dislike	Percent	Dislike Slightly	Percent	Dislike Moderately	Percent	Dislike Very Much	Percent	Sub-Total	Preference Incomplete	Not Tried	Total	Grand Total
Chicken:																				
	Mitchel:	26	86.67	2	6.67	1	3.33	0	0.00	0	0.00	1	3.33	0	0.00	30	0	0	30	
	Westover:	17	62.96	7	25.93	2	7.41	0	0.00	1	3.70	0	0.00	0	0.00	27	1	0	28	
	Kindley:	15	71.43	5	23.81	1	4.76	0	0.00	0	0.00	0	0.00	0	0.00	21	1	0	22	
	Langley:	16	72.73	4	18.18	0	0.00	2	9.09	0	0.00	0	0.00	0	0.00	22	0	0	22	
	Fairchild:	8	53.33	6	40.00	1	6.67	0	0.00	0	0.00	0	0.00	0	0.00	15	0	0	15	
	McChord:	19	79.17	4	16.67	0	0.00	1	4.17	0	0.00	0	0.00	0	0.00	24	0	0	24	
	Hickam:	22	73.33	4	13.33	3	10.00	1	3.33	0	0.00	0	0.00	0	0.00	30	0	0	30	
	Mather:	13	81.25	2	12.50	1	6.25	0	0.00	0	0.00	0	0.00	0	0.00	16	0	0	16	
																185	2	0	187	187
Hamburger:																				
	Mitchel:	18	56.25	6	18.75	4	12.50	0	0.00	3	9.38	0	0.00	1	3.13	32	0	0	32	
	Westover:	13	52.00	7	28.00	0	0.00	2	8.00	3	12.00	0	0.00	0	0.00	25	0	0	25	
	Kindley:	14	46.67	9	30.00	0	0.00	1	3.33	2	6.67	2	6.67	2	6.67	30	0	0	30	
	Langley:	13	61.90	4	19.05	2	9.52	2	9.52	0	0.00	0	0.00	0	0.00	21	1	0	22	
	Fairchild:	1	5.00	8	40.00	4	20.00	2	10.00	2	10.00	2	10.00	1	5.00	20	0	0	20	
	McChord:	4	23.53	9	52.94	2	11.76	1	5.88	1	5.88	0	0.00	0	0.00	17	0	0	17	
	Hickam:	11	45.83	8	33.33	1	4.17	0	0.00	2	8.33	0	0.00	2	8.33	24	0	0	24	
	Mather:	19	63.33	7	23.33	2	6.67	1	3.33	0	0.00	1	3.33	0	0.00	30	1	0	31	
																199	2	0	201	201
Beef & Pork Loaf:																				
	Mitchel:	7	41.18	4	23.53	1	5.88	1	5.88	1	5.88	1	5.88	2	11.76	17	0	1	18	
	Westover:	5	27.78	8	44.44	1	5.56	1	5.56	2	11.11	1	5.56	0	0.00	18	0	0	18	
	Kindley:	7	33.33	7	33.33	4	19.05	1	4.76	0	0.00	0	0.00	2	9.52	21	0	0	21	
	Langley:	5	38.46	2	15.38	3	23.08	1	7.69	0	0.00	2	15.38	0	0.00	13	0	0	13	
	Fairchild:	3	10.00	7	23.33	2	6.67	3	10.00	6	20.00	6	20.00	3	10.00	30	1	0	31	
	McChord:	5	35.71	4	28.57	2	14.29	2	14.29	0	0.00	1	7.14	0	0.00	14	0	0	14	
	Hickam:	8	34.78	5	21.74	6	26.09	2	8.70	1	4.35	0	0.00	1	4.35	23	0	1	24	
	Mather:	4	20.00	10	50.00	1	5.00	1	5.00	2	10.00	1	5.00	1	5.00	20	1	0	21	
																156	2	2	160	160
Cheese, Processed:																				
	Mitchel:	15	68.18	5	22.74	2	9.09	0	0.00	0	0.00	0	0.00	0	0.00	22	0	0	22	
	Westover:	4	25.00	4	25.00	4	25.00	1	6.25	0	0.00	1	6.25	2	12.50	16	0	2	18	
	Kindley:	4	28.57	5	35.71	0	0.00	0	0.00	0	0.00	0	0.00	5	35.71	14	0	1	15	
	Langley:	1	9.09	3	27.27	3	27.27	1	9.09	0	0.00	2	18.18	1	9.09	11	0	0	11	
	Fairchild:	6	42.86	3	21.43	2	14.29	1	7.14	0	0.00	1	7.14	1	7.14	14	0	0	14	
	McChord:	8	61.54	5	38.46	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	13	0	0	13	
	Hickam:	6	27.27	7	31.82	4	18.18	1	4.55	1	4.55	2	9.09	1	4.55	22	0	0	22	
	Mather:	2	11.11	6	33.33	4	22.22	3	16.67	1	5.56	1	5.56	1	5.56	18	0	6	24	
																130	0	9	139	139
Meat, Ground with Spaghetti:																				
	Mitchel:	17	58.62	6	20.69	3	10.34	3	10.34	0	0.00	0	0.00	0	0.00	29	0	0	29	
	Westover:	11	33.33	18	54.55	2	6.06	0	0.00	1	3.03	0	0.00	1	3.03	33	0	0	33	
	Kindley:	21	55.26	11	28.95	3	7.89	1	2.63	1	2.63	1	2.63	0	0.00	38	0	0	38	
	Langley:	19	50.00	12	31.58	4	10.53	3	7.89	0	0.00	0	0.00	0	0.00	38	0	0	38	
	Fairchild:	0	0.00	1	100.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	1	0	0	1	
	McChord:	11	45.83	6	25.00	2	8.33	3	12.50	1	4.17	0	0.00	1	4.17	24	0	0	24	
	Hickam:	5	31.25	7	43.75	1	6.25	1	6.25	1	6.25	1	6.25	0	0.00	16	0	0	16	
	Mather:	20	57.14	14	40.00	1	2.86	0	0.00	0	0.00	0	0.00	0	0.00	35	0	0	35	
																214	0	0	214	214
Beef and Corn:																				
	Mitchel:	14	63.64	7	31.82	1	4.55	0	0.00	0	0.00	0	0.00	0	0.00	22	0	0	22	
	Westover:	8	30.77	12	46.15	2	7.69	2	7.69	0	0.00	1	3.85	1	3.85	26	0	0	26	
	Kindley:	12	48.00	12	48.00	0	0.00	1	4.00	0	0.00	0	0.00	0	0.00	25	0	0	25	
	Langley:	9	39.13	12	52.17	1	4.35	1	4.35	0	0.00	0	0.00	0	0.00	23	0	0	23	
	Fairchild:	7	46.67	4	26.67	2	13.33	0	0.00	2	13.33	0	0.00	0	0.00	15	0	1	16	
	McChord:	10	52.63	8	42.11	1	5.26	0	0.00	0	0.00	0	0.00	0	0.00	19	1	0	20	
	Hickam:	14	56.00	7	28.00	2	8.00	0	0.00	1	4.00	1	4.00	0	0.00	25	0	0	25	
	Mather:	12	52.17	7	30.43	1	4.35	1	4.35	1	4.35	1	4.35	0	0.00	23	1	0	24	
																178	2	1	181	181
Ham and Eggs:																				
	Mitchel:	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0	0	0	
	Westover:	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0	0	0	
	Kindley:	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0	0	0	
	Langley:	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0	0	0	
	Fairchild:	9	28.13	13	40.63	3	9.38	4	12.50	0	0.00	3	9.38	0	0.00	32	0	1	33	
	McChord:	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0	0	0	
	Hickam:	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0	0	0	
	Mather:	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0	0	0	
																32	0	1	33	33
Meat and Noodles:																				
	Mitchel:	19	42.22	17	37.78	5	11.11	1	2.22	2	4.44	1	2.22	0	0.00	45	0	1	46	
	Westover:	16	38.10	16	38.10	5	11.90	2	4.76	1	2.38	0	0.00	2	4.76	42	0	0	42	
	Kindley:	11	26.83	17	41.46	3	7.32	6	14.63	2	4.88	0	0.00	2	4.88	41	0	1	42	
	Langley:	22	52.38	12	28.57	6	14.29	2	4.76	0	0.00	0	0.00	0	0.00	42	0	1	43	
	Fairchild:	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0	0	0	
	McChord:	19	51.35	10	27.03	4	10.81	1	2.70	1	2.70	0	0.00	2	5.41	37	0	0	37	
	Hickam:	16	44.44	12	33.33	2	5.56	2	5.56	3	8.33	1	2.78	0	0.00	36	0	2	38	
	Mather:	21	41.18	17	33.33	7	13.73	2	3.92	1	1.96	1	1.96	2	3.92	51	0	0	51	
																294	0	5	299	299
Beef Steak:																				
	Mitchel:	13	54.17	7	29.17	3	12.50	0	0.00	1	4.17	0	0.00	0	0.00	24	1	0	25	
	Westover:	12	57.14	5	23.81	3	14.29	1	4.76	0	0.00	0	0.00	0	0.00	21	1	0	22	
	Kindley:	17	60.71	6	21.43	1	3.58	1	3.58	2	7.14	0	0.00	1	3.58	28	0	0	28	
	Langley:	19	76.00	5	20.00	1	4.00	0	0.00	0	0.00	0	0.00	0	0.00	25	0	0	25	
	Fairchild:	5	33.33	8	53.33	1	6.67	0	0.00	1	6.67	0	0.00	0	0.00	15	0	0	15	
	McChord:	12	60.00	5	25.00	3	15.00	0	0.00	0	0.00	0	0.00	0	0.00	20	0	0	20	
	Hickam:	11	52.38	6	28.57	2	9.52	1	4.76	1	4.76	0	0.00	0	0.00	21	0	2	23	
	Mather:	12	57.14	5	23.81	2	9.52	1	4.76	1	4.76	0	0.00	0	0.00	21	0	0	21	
																175	2	2	179	179
Ham, fried:																				
	Mitchel:	17	68.00	6	24.00	1	4.00	0	0.00	0	0.00	0	0.00	1	4.00	25	0	1	26	
	Westover:	11	45.83	7	29.17	1	4.17	2	8.33	3	12.50	0	0.00	0	0.00	24	0	0	24	
	Kindley:	9	34.62	11	42.31	4	15.38	1	3.85	0	0.00	1	3.85	0	0.00	26	0	0	26	
	Langley:	9	56.25	5	31.25	1	6.25	1	6.25	0	0.00	0	0.00	0	0.00	16	0	0	16	
	Fairchild:	4	26.67	3	20.00	5	33.33	2	13.33	0	0.00	0	0.00	1	6.67	15	0	0	15	
	McChord:	14	70.00	5	25.00	1	5.00	0	0.00	0	0.00	0	0.00	0	0.00	20	0	0	20	
	Hickam:	9	42.86	7	33.33	2	9.52	1	4.76	1	4.76	0	0.00	1	4.76	21	0	1	22	
	Mather:	13	54.17	9	37.50	0	0.00	0	0.00	2	8.33	0	0.00	0	0.00	24	0	1	25	
																171	0	3	174	174
																		Incomplete, Column 38:		4
																				1771

TABLE 2C

DISTRIBUTION OF PREFERENCE BY BASES

	Like Very Much	Percent	Like Moderately	Percent	Like Slightly	Percent	Neither Like nor Dislike	Percent	Dislike Slightly	Percent	Dislike Moderately	Percent	Dislike Very Much	Percent	Sub-Total	Preference Incomplete	Not Tried	Total	Grand Total
Cookie, Oatmeal-Chocolate Chip: (Dessert Unit-A)																			
Mitchel:	68	71.58	18	18.95	6	6.32	3	3.16	0	0.00	0	0.00	0	0.00	95	2	14	111	
Westover:	45	45.45	35	35.35	12	12.12	5	5.05	2	2.02	0	0.00	0	0.00	99	3	9	111	
Kindley:	67	68.69	31	28.97	5	4.67	2	1.87	0	0.00	1	0.93	1	0.93	107	6	9	122	
Langley:	60	74.07	17	20.99	1	1.23	3	3.70	0	0.00	0	0.00	0	0.00	81	2	6	89	
Fairchild:	33	58.93	12	21.43	6	10.71	3	5.36	0	0.00	1	1.79	1	1.79	56	4	6	66	
McChord:	44	61.97	22	30.99	5	7.04	0	0.00	0	0.00	0	0.00	0	0.00	71	2	6	79	
Hickam:	70	70.71	19	19.19	7	7.07	0	0.00	1	1.01	2	2.02	0	0.00	99	2	14	115	
Mather:	58	63.74	24	26.37	6	6.59	2	2.20	1	1.10	0	0.00	0	0.00	91	3	6	100	
															689	24	70	793	793
Cookie, Oatmeal-Chocolate Chip: (Dessert Unit-B)																Incomplete, Column 39:			4
Mitchel:	47	66.20	17	23.94	3	4.23	4	5.63	0	0.00	0	0.00	0	0.00	71	0	4	75	
Westover:	27	65.85	11	26.83	2	4.88	1	2.44	0	0.00	0	0.00	0	0.00	41	0	10	51	
Kindley:	39	69.64	13	23.21	4	7.14	0	0.00	0	0.00	0	0.00	0	0.00	56	4	6	66	
Langley:	38	71.70	11	20.75	4	7.55	0	0.00	0	0.00	0	0.00	0	0.00	53	4	6	63	
Fairchild:	15	39.47	13	28.95	8	21.05	3	7.89	0	0.00	1	2.63	0	0.00	38	4	5	47	
McChord:	21	42.00	18	36.00	6	12.00	1	2.00	1	2.00	0	0.00	0	0.00	50	1	3	54	
Hickam:	26	70.27	9	24.32	1	2.70	1	2.70	0	0.00	0	0.00	0	0.00	37	3	6	46	
Mather:	42	64.62	18	27.69	4	6.15	1	1.54	0	0.00	0	0.00	0	0.00	65	5	2	72	
															411	21	42	474	474
Cookie, Sandwich: (Dessert Unit-A)																			
Mitchel:	81	81.00	14	14.00	3	3.00	1	1.00	0	0.00	0	0.00	1	1.00	100	0	11	111	
Westover:	43	44.79	35	36.46	11	11.46	5	5.21	1	1.04	1	1.04	0	0.00	96	6	9	111	
Kindley:	70	67.96	24	23.30	3	2.91	3	2.91	2	1.94	0	0.00	1	0.97	103	4	15	122	
Langley:	58	70.73	18	21.95	4	4.88	2	2.44	0	0.00	0	0.00	0	0.00	82	1	6	89	
Fairchild:	30	54.55	17	30.91	4	7.27	1	1.82	1	1.82	1	1.82	1	1.82	55	1	5	61	
McChord:	41	59.42	18	26.09	5	7.25	2	2.90	3	4.35	0	0.00	0	0.00	69	5	5	79	
Hickam:	66	66.67	22	22.22	8	8.08	0	0.00	1	1.01	2	2.02	0	0.00	99	2	14	115	
Mather:	47	52.81	31	34.83	3	3.37	6	6.74	2	2.25	0	0.00	0	0.00	89	4	7	100	
															693	28	72	793	793
Cookie, Sandwich: (Dessert Unit-B)																Incomplete, Column 39:			4
Mitchel:	48	68.57	17	24.29	3	4.29	2	2.86	0	0.00	0	0.00	0	0.00	70	1	4	75	
Westover:	28	66.67	13	30.95	1	2.38	0	0.00	0	0.00	0	0.00	0	0.00	42	2	7	51	
Kindley:	41	69.49	16	27.12	2	3.39	0	0.00	0	0.00	0	0.00	0	0.00	59	3	4	66	
Langley:	39	69.64	13	23.21	4	7.14	0	0.00	0	0.00	0	0.00	0	0.00	56	2	5	63	
Fairchild:	16	43.24	10	27.03	7	18.92	4	10.81	0	0.00	0	0.00	0	0.00	37	4	6	47	
McChord:	19	41.30	16	34.78	4	8.70	5	10.87	2	4.35	0	0.00	0	0.00	46	6	2	54	
Hickam:	23	58.97	14	35.90	1	2.56	1	2.56	0	0.00	0	0.00	0	0.00	39	1	6	46	
Mather:	40	67.80	14	23.73	3	5.08	1	1.69	0	0.00	1	1.69	0	0.00	59	10	3	72	
															408	29	37	474	474
Chocolate Disc:																			
Mitchel:	55	60.44	16	17.58	8	8.79	5	5.49	1	1.10	4	4.40	2	2.20	91	1	19	111	
Westover:	40	43.01	26	27.96	12	12.90	9	9.68	4	4.30	1	1.08	1	1.08	93	2	16	111	
Kindley:	59	57.28	20	19.42	7	6.80	9	8.74	1	0.97	3	2.91	4	3.88	103	2	17	122	
Langley:	45	59.21	17	22.37	9	11.84	5	6.58	0	0.00	0	0.00	0	0.00	76	1	12	89	
Fairchild:	24	48.98	14	28.57	3	6.12	3	6.12	3	6.12	0	0.00	2	4.08	49	5	12	66	
McChord:	35	54.69	24	21.88	9	14.06	4	6.25	1	1.56	0	0.00	1	1.56	64	7	8	79	
Hickam:	51	54.26	22	23.40	15	15.96	1	1.06	1	1.06	2	2.13	2	2.13	94	7	14	115	
Mather:	41	47.13	15	17.24	15	17.24	5	5.75	2	2.30	5	5.75	4	4.60	87	4	9	100	
															657	29	107	793	793
Starch-Jelly Disc: (Lemon)																Incomplete, Column 39:			4
Mitchel:	1	33.33	0	0.00	0	0.00	1	33.33	1	33.33	0	0.00	0	0.00	3	0	0	3	
Westover:	1	25.00	1	25.00	1	25.00	0	0.00	0	0.00	1	25.00	0	0.00	4	0	0	4	
Kindley:	4	57.14	3	42.86	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	7	0	3	10	
Langley:	1	33.33	0	0.00	1	33.33	1	33.33	0	0.00	0	0.00	0	0.00	3	0	2	5	
Fairchild:	1	14.29	1	14.29	2	28.57	2	28.57	1	14.29	0	0.00	0	0.00	7	0	3	10	
McChord:	3	75.00	0	0.00	0	0.00	1	25.00	0	0.00	0	0.00	0	0.00	4	0	1	5	
Hickam:	6	66.67	1	11.11	1	11.11	1	11.11	0	0.00	0	0.00	0	0.00	9	0	1	10	
Mather:	1	50.00	0	0.00	1	50.00	0	0.00	0	0.00	0	0.00	0	0.00	2	3	3	8	
															39	3	22	64	64
Starch-Jelly Disc: (Orange)																			
Mitchel:	1	33.33	0	0.00	0	0.00	1	33.33	1	33.33	0	0.00	0	0.00	3	0	0	3	
Westover:	3	18.75	8	50.00	3	18.75	0	0.00	0	0.00	0	0.00	2	12.50	16	0	1	17	
Kindley:	2	40.75	2	12.50	2	12.50	2	12.50	1	6.25	0	0.00	2	12.50	16	2	5	23	
Langley:	5	29.41	6	35.29	2	11.76	2	11.76	0	0.00	0	0.00	2	11.76	17	1	4	22	
Fairchild:	0	0.00	2	28.57	1	14.29	1	14.29	0	0.00	1	14.29	2	28.57	7	2	1	10	
McChord:	7	35.00	7	35.00	3	15.00	3	15.00	0	0.00	0	0.00	0	0.00	20	0	1	21	
Hickam:	1	14.29	3	42.86	1	14.29	1	14.29	0	0.00	0	0.00	1	14.29	7	0	0	7	
Mather:	2	18.18	5	45.45	3	27.27	1	9.09	0	0.00	0	0.00	0	0.00	11	1	1	13	
															97	7	12	116	116
Starch-Jelly Disc: (Cherry)																			
Mitchel:	19	55.88	5	14.71	4	11.76	2	5.88	1	2.94	1	2.94	2	5.88	34	3	7	44	
Westover:	1	6.25	4	25.00	4	25.00	4	25.00	1	6.25	1	6.25	1	6.25	16	2	9	27	
Kindley:	7	31.82	5	22.73	3	13.64	4	18.18	2	9.09	1	4.55	0	0.00	22	0	8	30	
Langley:	4	33.33	2	16.67	1	8.33	1	8.33	2	16.67	0	0.00	2	16.67	12	0	5	17	
Fairchild:	3	25.00	4	33.33	2	16.67	1	8.33	1	8.33	1	8.33	0	0.00	12	0	3	15	
McChord:	3	27.27	5	45.45	1	9.09	1	9.09	0	0.00	1	9.09	0	0.00	11	0	4	15	
Hickam:	16	42.11	6	15.79	7	18.42	7	18.42	0	0.00	0	0.00	2	5.26	38	1	6	45	
Mather:	6	33.33	5	27.78	1	5.56	4	22.22	0	0.00	2	11.11	0	0.00	18	0	3	21	
															163	6	44	213	213
Starch-Jelly Disc: (Licorice)																			
Mitchel:	0	0.00	1	20.00	2	40.00	1	20.00	0	0.00	1	20.00	0	0.00	5	1	3	9	
Westover:	3	27.27	3	27.27	1	9.09	3	27.27	1	9.09	0	0.00	0	0.00	11	0	4	15	
Kindley:	8	61.54	3	23.08	1	7.69	0	0.00	1	7.69	0	0.00	0	0.00	13	0	6	19	
Langley:	3	33.33	4	26.67	3	33.33	1	6.67	1	6.67	1	6.67	2	13.33	15	1	4	20	
Fairchild:	6	50.00	2	16.67	1	8.33	0	0.00	0	0.00	2	16.67	1	8.33	12	0	3	15	
McChord:	4	26.67	6	40.00	2	13.33	2	13.33	0	0.00	0	0.00	1	6.67	15	0	5	20	
Hickam:	4	18.18	4	18.18	2	9.09	2	9.09	1	4.55	1	4.55	8	36.36	22	0	9	31	
Mather:	3	15.79	3	15.79	2	10.53	4	21.05	2	10.53	3	15.79	2	10.53	19	2	2	23	
															112	4	36	152	152
Starch-Jelly Disc: (Lime)																			
Mitchel:	6	21.43	10	35.71	2	7.14	3	10.71	4	14.29	0	0.00	3	10.71	28	1	7	36	
Westover:	3	13.64	4	18.18	5	22.73	4	18.18	2	4.55	1	4.55	4	18.18	22	0	8	30	
Kindley:	11	44.00	7	28.00	0	0.00	4	16.00	0	0.00	3	12.00	0	0.00	25	2	9	36	
Langley:	5	33.33	4	26.67	3	20.00	3	20.00	0	0.00	0	0.00	0	0.00	15	1	3	19	
Fairchild:	6	66.67	2	22.22	0	0.00	0	0.00	0	0.00	1	11.11	0	0.00	9	0	3	12	
McChord:	4	33.33	3	25.00	2	16.67	1	8.33	1	8.33	1	8.33	0	0.00	12	0	3	15	
Hickam:	4	33.33	3	25.00	0	0.00	2	16.67	1	8.33	2	16.67	0	0.00	12	1	3	16	
Mather:	7	24.14	7	24.14	5	17.24	4	13.79	2	6.90	2	6.90	2	6.90	29	1	1	31	
															152	6	34	192	192
																Incomplete, Column 39:			4
																Incomplete, Column 40:			56

TABLE 2D

DISTRIBUTION OF PREFERENCE BY BASES

		Like Very Much	Percent	Like Moderately	Percent	Like Slightly	Percent	Neither Like Nor Dislike	Percent	Dislike Slightly	Percent	Dislike Moderately	Percent	Dislike Very Much	Percent	Sub-Total	Preference Incomplete	Not Tried	Total	Grand-To
Pound Cake:																				
	Mitchel:	12	60.00	4	20.00	1	5.00	3	15.00	0	0.00	0	0.00	0	0.00	20	0	2	22	
	Westover:	12	66.67	3	16.67	2	11.11	1	5.56	0	0.00	0	0.00	0	0.00	18	0	3	21	
	Kindley:	12	75.00	1	6.25	1	6.25	1	6.25	1	6.25	0	0.00	0	0.00	16	0	1	17	
	Langley:	13	76.47	2	11.76	2	11.76	0	0.00	0	0.00	0	0.00	0	0.00	17	0	1	18	
	Fairchild:	5	38.46	3	23.08	0	0.00	1	7.69	2	15.38	1	7.69	1	7.69	13	0	2	15	
	McChord:	11	73.33	2	13.33	1	6.67	0	0.00	1	6.67	0	0.00	0	0.00	15	0	1	16	
	Hickam:	14	70.00	3	15.00	1	5.00	1	5.00	1	5.00	0	0.00	0	0.00	20	0	2	22	
	Mather:	12	48.00	7	28.00	3	12.00	1	4.00	1	4.00	0	0.00	1	4.00	25	1	1	27	
																144	1	13	158	158
Fruit Cake:																				
	Mitchel:	18	81.82	2	9.09	1	4.55	0	0.00	1	4.55	0	0.00	0	0.00	22	0	3	25	
	Westover:	17	68.00	4	16.00	0	0.00	0	0.00	2	8.00	2	8.00	0	0.00	25	1	4	30	
	Kindley:	13	52.00	5	20.00	2	8.00	3	12.00	1	4.00	0	0.00	1	4.00	25	0	2	27	
	Langley:	7	36.84	7	36.84	3	15.79	2	10.53	0	0.00	0	0.00	0	0.00	19	0	0	19	
	Fairchild:	9	69.23	3	23.08	0	0.00	0	0.00	1	7.69	0	0.00	0	0.00	13	0	3	16	
	McChord:	20	100.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	20	1	1	22	
	Hickam:	11	61.11	3	16.67	1	5.56	0	0.00	2	11.11	0	0.00	1	5.56	18	0	5	23	
	Mather:	11	50.00	6	27.27	1	4.55	2	9.09	1	4.55	0	0.00	1	4.55	22	0	5	27	
																164	2	23	189	189
Date Pudding:																				
	Mitchel:	4	25.00	3	18.75	4	25.00	4	25.00	1	6.25	0	0.00	0	0.00	16	0	1	17	
	Westover:	5	27.78	6	33.33	1	5.56	1	5.56	2	11.11	1	5.56	2	11.11	18	0	4	22	
	Kindley:	4	50.00	0	0.00	3	37.50	0	0.00	0	0.00	0	0.00	1	12.50	8	1	7	16	
	Langley:	6	28.57	4	19.05	2	9.53	3	14.29	3	14.29	1	4.76	2	9.53	21	0	3	24	
	Fairchild:	2	16.67	4	33.33	1	8.33	0	0.00	0	0.00	2	16.67	3	25.00	12	0	3	15	
	McChord:	8	47.06	5	29.41	2	11.76	1	5.88	0	0.00	0	0.00	1	5.88	17	0	1	18	
	Hickam:	4	28.57	5	35.71	2	14.29	0	0.00	1	7.14	1	7.14	1	7.14	14	0	4	18	
	Mather:	6	30.00	6	30.00	3	15.00	0	0.00	2	10.00	2	10.00	1	5.00	20	0	2	22	
																126	1	25	152	152
																	Incomplete, Column 40:			1
Crackers:																				
	Mitchel:	97	42.54	79	34.65	25	10.96	14	6.14	6	2.63	6	2.63	1	0.44	228	1	21	250	
	Westover:	69	31.36	73	33.18	23	10.45	24	10.91	17	7.73	6	2.73	8	3.64	220	2	14	236	
	Kindley:	82	37.61	63	28.90	27	12.39	29	13.30	6	2.75	3	1.38	8	3.67	218	4	26	248	
	Langley:	76	37.81	63	31.34	33	16.42	18	8.96	8	3.98	2	1.00	1	0.50	201	4	8	213	
	Fairchild:	22	16.42	36	26.87	23	17.17	32	23.88	8	5.97	12	8.96	1	0.75	134	8	21	163	
	McChord:	46	27.88	50	30.30	26	15.76	27	16.36	9	5.45	4	2.42	3	1.82	165	5	19	189	
	Hickam:	56	27.18	92	44.66	28	13.59	11	5.34	9	4.37	4	1.94	6	2.91	206	3	15	224	
	Mather:	69	29.87	79	34.20	25	10.82	28	12.12	18	7.79	5	2.16	7	3.03	231	6	11	248	
																1603	33	135	1771	1771
Soluble Milk:																				
	Mitchel:	49	42.61	21	18.26	7	6.09	7	6.09	5	4.35	3	2.61	23	20.00	115	0	135	250	
	Westover:	8	38.60	2	4.65	7	16.28	12	27.91	5	11.63	3	6.98	7	16.28	43	3	190	236	
	Kindley:	7	16.28	4	9.30	2	4.65	7	16.28	4	9.30	4	9.30	15	34.88	43	0	205	248	
	Langley:	6	14.63	8	19.51	7	17.07	3	7.32	6	14.63	0	0.00	11	26.83	41	4	168	213	
	Fairchild:	10	25.64	11	28.21	4	10.26	5	12.82	4	10.26	2	5.13	3	7.69	39	9	115	163	
	McChord:	2	14.29	5	35.71	2	14.29	2	14.29	1	7.14	1	7.14	1	7.14	14	7	168	189	
	Hickam:	8	12.50	35	54.69	13	20.31	1	1.56	4	6.25	1	1.56	2	3.13	64	2	158	224	
	Mather:	24	19.05	30	23.81	23	18.25	22	17.46	15	11.90	6	4.76	6	4.76	126	6	116	248	
																485	31	1255	1771	1771
Coffee:																				
	Mitchel:	109	65.66	31	18.67	12	7.23	5	3.01	3	1.81	2	1.20	4	2.41	166	0	84	250	
	Westover:	56	51.38	28	25.69	10	9.17	5	4.59	5	4.59	2	1.83	3	2.75	109	0	127	236	
	Kindley:	36	46.15	24	30.77	8	10.26	3	3.85	3	3.85	1	1.28	3	3.85	78	0	170	248	
	Langley:	24	38.10	14	22.22	11	17.46	5	7.94	2	3.17	0	0.00	7	11.11	63	3	147	213	
	Fairchild:	17	30.36	16	28.57	10	17.86	6	10.71	3	5.36	2	3.57	2	3.57	56	9	98	163	
	McChord:	7	36.84	7	36.84	2	10.53	0	0.00	0	0.00	1	5.26	2	10.53	19	6	164	189	
	Hickam:	58	61.44	20	22.22	6	6.67	2	2.22	0	0.00	1	1.11	3	3.33	90	2	132	224	
	Mather:	60	35.50	53	31.36	19	11.24	13	7.69	10	5.92	7	4.14	7	4.14	169	6	73	248	
																750	26	995	1771	1771
Tea:																				
	Mitchel:	58	64.44	12	13.33	9	10.00	1	1.11	0	0.00	0	0.00	0	0.00	80	1	169	250	
	Westover:	47	64.38	12	16.44	6	8.22	5	6.85	2	2.74	0	0.00	1	1.07	73	4	159	236	
	Kindley:	37	61.67	10	16.67	9	15.00	1	1.67	1	1.67	0	0.00	2	3.33	60	0	188	248	
	Langley:	17	54.84	6	19.35	2	6.45	1	3.23	0	0.00	0	0.00	5	16.13	31	2	180	213	
	Fairchild:	23	38.98	19	32.20	9	15.25	6	10.17	2	3.39	0	0.00	0	0.00	59	6	98	163	
	McChord:	4	26.67	6	40.00	1	6.67	0	0.00	1	6.67	2	13.33	1	6.67	15	5	169	189	
	Hickam:	32	39.02	30	36.59	15	18.29	3	3.66	1	1.22	0	0.00	1	1.22	82	2	140	224	
	Mather:	53	63.10	20	23.81	6	7.14	1	1.19	2	2.38	2	2.38	0	0.00	84	6	158	248	
																484	26	1261	1771	1772
Sugar:																				
	Mitchel:	115	82.14	15	10.71	6	4.29	4	2.86	0	0.00	0	0.00	0	0.00	140	2	108	250	
	Westover:	78	72.22	17	15.74	1	0.93	10	9.26	1	0.93	1	0.93	0	0.00	108	3	125	236	
	Kindley:	59	69.41	12	14.12	7	8.24	6	7.06	0	0.00	0	0.00	1	1.18	85	0	163	248	
	Langley:	55	61.11	19	21.11	8	8.89	6	6.67	0	0.00	1	1.11	1	1.11	90	6	117	213	
	Fairchild:	43	62.32	15	21.74	8	11.59	3	4.35	0	0.00	0	0.00	0	0.00	69	10	84	163	
	McChord:	13	48.15	9	33.33	1	3.70	3	10.34	0	0.00	0	0.00	1	3.70	27	4	158	189	
	Hickam:	86	77.48	11	9.91	9	8.11	3	2.70	1	0.90	0	0.90	1	0.90	111	6	107	224	
	Mather:	111	72.61	22	14.19	7	4.52	13	4.52	1	0.65	1	0.65	0	0.00	155	12	81	248	
																785	43	943	1771	1771
Chewing Gum:																				
	Mitchel:	161	83.42	26	13.47	6	3.11	0	0.00	0	0.00	0	0.00	0	0.00	193	1	56	250	
	Westover:	109	71.24	30	19.61	6	3.92	5	3.27	2	1.31	0	0.00	1	0.65	153	5	78	236	
	Kindley:	116	72.05	27	16.77	13	8.07	5	3.11	0	0.00	0	0.00	0	0.00	161	0	87	248	
	Langley:	109	70.32	33	21.29	8	5.16	5	3.23	0	0.00	0	0.00	0	0.00	155	4	54	213	
	Fairchild:	50	47.62	33	31.43	8	7.62	14	13.33	0	0.00	0	0.00	0	0.00	105	10	48	163	
	McChord:	56	49.56	38	33.63	8	7.08	9	7.96	0	0.00	1	0.88	1	0.88	113	2	74	189	
	Hickam:	105	70.47	24	16.11	16	10.74	3	2.01	1	0.67	0	0.00	0	0.00	149	3	72	224	
	Mather:	125	63.45	44	22.34	12	6.09	12	6.09	2	1.02	1	0.51	1	0.51	197	8	43	248	
																1226	33	512	1771	1771
Salt:																				
	Mitchel:	38	82.61	7	15.22	1	2.17	0	0.00	0	0.00	0	0.00	0	0.00	46	0	204	250	
	Westover:	41	67.21	13	21.31	1	1.64	5	8.20	0	0.00	0	0.00	1	1.64	61	3	172	236	
	Kindley:	51	71.83	14	19.72	2	2.82	4	5.63	0	0.00	0	0.00	0	0.00	71	0	177	248	
	Langley:	57	71.25	12	15.00	4	5.00	5	6.25	0	0.00	0	0.00	2	2.50	80	4	129	213	
	Fairchild:	22	57.89	10	26.32	3	7.89	3	7.89	0	0.00	0	0.00	0	0.00	38	10	115	163	
	McChord:	17	54.84	10	32.26	0	0.00	3	9.68	0	0.00	0	0.00	1	3.23	31	4	154	189	
	Hickam:	59	75.64	11	14.10	7	8.97	1	1.28	0	0.00	0	0.00	0	0.00	78	1	145	224	
	Mather:	51	71.83	13	18.31	2	2.82	5	7.04	0	0.00	0	0.00	0	0.00	71	5	172	248	
																476	27	1268	1771	1771
Pepper:																				
	Mitchel:	32	86.49	4	10.81	1	2.70	0	0.00	0	0.00	0	0.00	0	0.00	37	0	213	250	
	Westover:	43	72.88	11	18.64	1	1.69	4	6.78	0	0.00	0	0.00	0	0.00	59	3	174	236	
	Kindley:	42	70.00	12	20.00	3	5.00	3	5.00	0	0.00	0	0.00	0	0.00	60	1	187	248	
	Langley:	49	70.00	9	12.86	5	7.14	7	10.00	0	0.00	0	0.00	0	0.00	70	3	140	213	
	Fairchild:	16	50.00	9	28.13	2	6.25	3	9.38	0	0.00	1	3.13	1	3.13	32	11	120	163	
	McChord:	15	50.00	10	33.33	0	0.00	4	13.33	0	0.00	0	0.00	1	3.33	30	4	155	189	
	Hickam:	63	79.75	8	10.13	7	8.86	1	1.27	0	0.00	0	0.00	0	0.00	79	0	145	224	
	Mather:	46	70.77	10	15.38	3	4.62	6	9.23	0	0.00	0	0.00	0	0.00	65	5	178	248	
																432	27	1312	1771	1771

TABLE 3

Distribution of Authorized Menus

Principle Authorized Menus	Number Complete Replies	Percent Grand Total	Percent Sub-total	Authorized Sub-Menus	Number Complete Replies	Percent Grand Total	Percent Sub-total
1	92	5.19	8.72	1211	10	0.56	0.95
				1212	9	0.51	0.85
				1213	21	1.18	1.99
				1214	25	1.41	2.37
				1215	27	1.52	2.56
2	128	7.23	12.13	1811	11	0.62	1.04
				1812	28	1.58	2.65
				1813	36	1.98	3.41
				1814	26	1.41	2.46
				1815	27	1.52	2.56
3	129	7.28	12.23	2511	8	0.45	0.76
				2512	17	0.85	1.61
				2513	39	2.20	3.70
				2514	22	1.24	2.09
				2515	43	2.43	4.08
4	134	7.57	12.70	2011	12	0.68	1.14
				2012	20	1.13	1.90
				2013	32	1.81	3.03
				2014	36	2.03	3.41
				2015	34	1.92	3.22
5	13	0.73	1.23	3620	13	0.73	1.23
6	103	5.82	9.76	3420	103	5.82	9.76
7	112	6.32	10.62	5120	112	6.32	10.62
8	103	5.82	9.76	5331	103	5.82	9.76
9	133	7.51	12.61	4932	133	7.51	12.61
10	108	6.10	10.24	4733	108	6.10	10.24
	1055	59.60%	100.00%		1055	59.60%	100.00%

Subtotal (Complete Authorized Menus):	1055;	percent:	59.6%
Complete Unauthorized Menus :	654;	percent:	36.9%
Replies Incomplete as to menu :	62;	percent:	3.5%
Grand Total:	1771		100.0%

Figure 14. Caloric Content of Unauthorized Menus

Menu Code Number	Caloric Content	Menu Code Number	Caloric Content	Menu Code Number	Caloric Content	Menu Code Number	Caloric Content	Menu Code Number	Caloric Content	Menu Code Number	Caloric Content	Menu Code Number	Caloric Content
1012	1263	1712	1153	2414	1084	3212	1349	4012	1259	4633	1263	5231	1229
1013	1263	1713	1153	2415	1084	3213	1349	4014	1259	4712	1149	5232	1443
1014	1263	1714	1153	2420	947	3215	1349	4015	1259	4713	1149	5313	1534
1020	1126	1715	1153	2431	964	3220	1212	4020	1122	4714	1149	5314	1534
1112	1254	1731	1033	2433	1094	3315	1534	4032	1353	4720	1012	5315	1534
1113	1254	1820	1156	2520	947	3320	1397	4033	1269	4731	1029	5320	1397
1120	1117	1833	1303	2632	1337	3331	1414	4113	1250	4732	1243	5332	1628
1131	1134	1913	1324	2712	1139	3332	1628	4120	1113	4813	1289	5333	1544
1132	1348	1932	1418	2713	1139	3411	1081	4132	1344	4814	1289	5415	1081
1220	1229	1933	1334	2714	1139	3412	1081	4213	1362	4815	1289	5420	944
1232	1460	2020	1112	2715	1139	3413	1081	4214	1362	4820	1152	5431	961
1311	1551	2031	1129	2720	1002	3414	1081	4220	1225	4831	1169	5514	1177
1313	1551	2032	1343	2732	1233	3415	1081	4232	1456	4832	1383	5515	1177
1314	1551	2033	1259	2811	1279	3431	961	4233	1372	4833	1299	5520	1040
1315	1551	2111	1240	2812	1279	3512	1177	4311	1547	4912	1320	5531	1057
1320	1414	2112	1240	2813	1279	3513	1177	4313	1547	4913	1320	5620	1103
1331	1431	2113	1240	2814	1279	3520	1040	4315	1547	4915	1320	5631	1057
1333	1561	2114	1240	2815	1279	3532	1271	4320	1410	4920	1183	5713	1136
1411	1098	2115	1240	2820	1142	3614	1240	4331	1427	4931	1200	5714	1136
1412	1098	2120	1103	2913	1310	3631	1120	4333	1557	4933	1330	5715	1136
1413	1098	2131	1120	2920	1173	3712	1136	4413	1094	5015	1246	5720	999
1414	1098	2211	1352	2931	1190	3713	1136	4415	1094	5020	1109	5731	1016
1415	1098	2212	1352	2932	1404	3714	1136	4420	957	5031	1126	5733	1146
1420	961	2213	1352	3011	1246	3715	1136	4431	974	5112	1237	5820	1139
1431	978	2214	1352	3013	1246	3720	999	4432	1188	5113	1237	5831	1156
1511	1194	2215	1352	3015	1246	3731	1016	4433	1104	5114	1237	5913	1307
1512	1194	2220	1215	3020	1109	3732	1230	4511	1190	5115	1237	5920	1170
1513	1194	2312	1537	3032	1340	3733	1146	4513	1190	5131	1117	5931	1187
1514	1194	2315	1537	3111	1237	3814	1276	4520	1190	5132	1331	5932	1401
1515	1194	2320	1400	3113	1237	3820	1139	4531	1070	5133	1247	5933	1317
1520	1057	2331	1417	3114	1237	3831	1156	4532	1284	5211	1349		
1633	1267	2332	1631	3115	1237	3913	1307	4533	1200	5213	1349		
1631	1137	2412	1084	3120	1100	3920	1170	4614	1253	5215	1349		
1711	1153	2413	1084	3211	1349	3932	1401	4631	1133	5220	1212		

TABLE 4

Distribution and Frequency of Unauthorized Menus

Number of Menus	Frequency	Number x Frequency
119	1	119
49	2	98
25	3	75
16	4	64
6	5	30
7	6	42
4	8	32
1	9	9
1	10	10
3	11	33
1	12	12
1	18	18
1	112	112
	Total Unauthorized Menus:	654

TABLE 5

Relation of Consumption to Acceptability of Meat Items

Item		Like Very Much	Like Moderately	Like Slightly	Neither Like nor Dislike	Dislike Slightly	Dislike Moderately	Dislike Very Much	Sub-Total	Incomplete (Col. 12)	Incomplete (Cols. 10-11)	Not Tried	Total
Chicken	Average % Consumed:	98.8	92.0	84.7	87.5	65.0	100.0	——					
	Number of Subjects:	136	34	9	4	1	1	0	185	2	0	0	187
Hamburger	Average % Consumed:	98.6	94.8	79.0	88.3	84.5	50.6	61.7					
	Number of Subjects:	92	58	15	9	13	5	6	198	2	1	0	201
Beef and Pork Loaf	Average % Consumed:	97.0	93.3	79.3	87.0	92.4	73.5	61.4					
	Number of Subjects:	44	47	20	11	12	12	9	155	2	1	2	160
Cheese, Processed	Average % Consumed:	79.9	66.7	48.6	39.7	48.0	39.3	34.5					
	Number of Subjects:	46	38	19	7	2	6	12	130	0	0	9	139
Meat, Ground, with Spaghetti	Average % Consumed:	97.1	93.7	92.3	86.8	69.8	78.5	37.5					
	Number of Subjects:	104	75	16	11	4	2	2	214	0	0	0	214
Beef and Corn	Average % Consumed:	96.5	91.2	78.2	75.8	68.8	57.3	11.0					
	Number of Subjects:	86	69	10	5	4	3	1	178	2	0	1	181
Ham and Eggs	Average % Consumed:	99.6	94.4	91.3	94.8	——	78.3	——					
	Number of Subjects:	9	13	3	4	0	3	0	32	0	0	1	33
Meat and Noodles	Average % Consumed:	98.2	96.1	86.9	90.0	57.1	58.7	47.4					
	Number of Subjects:	123	101	32	16	10	3	8	293	0	2	4	299
Beef Steak	Average % Consumed:	97.5	86.2	88.3	82.8	67.2	——	40.0					
	Number of Subjects:	100	46	16	4	6	0	1	173	2	2	2	179
Ham, fried	Average % Consumed:	93.6	93.0	71.3	80.3	69.0	100.0	41.0					
	Number of Subjects:	85	53	15	6	6	1	3	169	0	2	3	174
													1767
											Incomplete, Column 38:		4
											Total :		1771

TABLE 6

Consumption Versus Recommendation for Quantitative Alteration

Component	Number	Average Percent Consumed of Available Calories*	Average Caloric Intake
Fruit			
Add to:	117	99.3	121
Subtract from:	38	91.8	114
Do Not Change:	1528	97.8	120
Incomplete:	88		
Total:	1771		
Meat-or-Cheese			
Add to:	199	93.4	322
Subtract from:	142	70.3	300
Do Not Change:	1357	92.1	321
Incomplete:	73		
Total:	1771		
Dessert			
Add to:	64	91.4	353
Subtract from:	119	84.6	320
Do Not Change:	1483	94.2	351
Incomplete:	105		
Total:	1771		
Cracker			
Add to:	59	83.5	187
Subtract from:	410	54.8	121
Do Not Change:	1217	73.8	164
Incomplete:	85		
Total:	1771		
Accessory Packet			
Add to:	84	83.3	98
Subtract from:	203	76.7	91
Do Not Change:	1386	73.4	87
Incomplete:	98		
Total:	1771		

*Computed considering each recommendation group as a unit, e.g.,

$$\bar{X} = \frac{\text{Sum of calories consumed by recommending group}}{\text{Sum of calories available to recommending group}} \times 100$$

TABLE 7

Subject Recommendation for Quantitative Alteration of Food Packet Components

COMPONENT	Add To	* Percent	Subtract From	* Percent	Do Not Change	* Percent	Sub-total	Incomplete (cols. 32-36)	Total
Fruit	119	7.05	38	2.25	1531	90.70	1688	83	1771
Meat-or-Cheese	200	11.74	142	8.34	1361	79.92	1703	68	1771
Dessert	65	3.89	119	7.13	1486	88.98	1670	101	1771
Cracker	60	3.55	411	24.31	1220	72.15	1691	80	1771
Accessory Packet	84	5.01	203	12.10	1390	82.89	1677	94	1771

* Percentages cited are computed on basis of the subtotal for the respective component.

TABLE 8

Time Since Last Meal Versus Preference for Quantitative Alteration

	Add To	% *	Subtract From	% *	Do Not Change	% *	Sub-total (cols. 32-36)	Incomplete	Total
Those who ate more than 4 hours previously									
COMPONENT									
Fruit	80	6.69	28	2.34	1088	90.97	1196	66	1262
Meat-or-Cheese	156	12.88	105	8.67	950	78.45	1211	51	1262
Dessert	49	4.14	84	7.09	1051	88.77	1184	78	1262
Crackers	47	3.91	289	24.63	865	72.02	1201	61	1262
Accessory Packet	66	5.54	140	11.75	985	82.70	1191	71	1262
Those who ate 4 or less hours previously									
COMPONENT									
Fruit	30	7.79	7	1.82	348	90.39	385	11	396
Meat-or-Cheese	38	9.90	25	6.51	321	83.59	384	12	396
Dessert	11	2.89	28	7.37	341	89.74	380	16	396
Crackers	8	2.08	107	27.86	269	70.05	384	12	396
Accessory Packet	14	3.68	44	11.58	322	84.74	380	16	396

Incomplete, Columns 19-21: 113
Grand Total: Sum of like-component totals in each group plus 113, or 1771
* Percentages cited are computed on basis of the sub-total for the respective component.

TABLE 9

Time and Size of Last Meal Versus Preference for Quantitative Alteration

Size of last meal:	Add To						Subtract From						Do Not Change						Sub-total	Incomplete (Cols. 32-36)	Incomplete (Col. 22)	Total
	light	percent	moderate	percent	large	percent	light	percent	moderate	percent	large	percent	light	percent	moderate	percent	large	percent				
Those who ate more than 4 hours previously:																						
COMPONENT																						
Fruit	30	2.53	40	3.37	10	0.84	8	0.67	13	1.10	7	0.59	419	35.30	557	46.93	103	8.68	1187	66	9	1262
Meat-or-Cheese	60	4.99	75	6.23	18	1.50	40	3.33	53	4.41	12	1.00	366	30.42	490	40.73	89	7.40	1203	51	8	1262
Dessert	13	1.11	30	2.55	5	0.43	24	2.04	45	3.83	14	1.19	416	35.37	528	44.90	101	8.59	1176	78	8	1262
Crackers	15	1.26	23	1.93	9	0.76	93	7.80	155	13.00	36	3.02	352	29.53	436	36.58	73	6.12	1192	61	9	1262
Accessory Packet	31	2.62	27	2.28	7	0.59	42	3.55	80	6.77	17	1.44	385	32.57	499	42.22	94	7.95	1182	71	9	1262
Those who ate 4 or fewer hours previously:																						
COMPONENT																						
Fruit	14	3.65	13	3.39	3	0.78	1	0.26	5	1.30	1	0.26	160	41.67	152	39.58	35	9.11	384	11	1	396
Meat-or-Cheese	17	4.43	18	4.69	3	0.78	14	3.65	10	2.60	1	0.26	144	37.50	142	36.98	35	9.11	384	12	0	396
Dessert	6	1.58	4	1.05	1	0.26	10	2.63	13	3.42	5	1.32	158	41.58	148	38.95	35	9.21	380	16	0	396
Crackers	5	1.30	1	0.26	2	0.52	44	11.46	50	13.02	13	3.39	126	32.81	119	30.99	24	6.25	384	12	0	396
Accessory Packet	4	1.05	10	2.63	0	0.00	14	3.68	26	6.84	4	1.05	157	41.32	131	34.47	34	8.95	380	16	0	396

Incomplete, Columns 19-21: 113; Grand Total: 1262 plus 396 plus 113, or 1771
Percentages cited are computed on basis of subtotal for the respective component.

TABLE 10

Relation of Time Since Last Meal and Consumption of Other than Food Packet Items to Preference for Quantitative Alteration

Those who ate more than 4 hours previously:

	Other Than Ration Items									Ration Items Only								
COMPONENT	Add To	Percent	Subtract From	Percent	Do Not Change	Percent	Sub-Total	Incomplete	Total	Add To	Percent	Subtract From	Percent	Do Not Change	Percent	Sub-Total	Incomplete (Col. 32-36)	Total
Fruit	10	6.80	1	0.40	136	92.52	147	9	156	68	6.61	26	2.53	934	90.86	1028	55	1083
Meat-or-Cheese	18	12.08	15	10.07	116	77.85	149	7	156	137	13.15	89	8.54	816	78.31	1042	41	1083
Dessert	10	6.94	7	4.86	127	88.19	144	12	156	38	3.73	77	7.55	905	88.73	1020	63	1083
Crackers	5	3.42	45	30.82	96	65.75	146	10	156	41	3.97	240	23.21	753	72.82	1034	49	1083
Accessory Packet	6	4.20	21	14.69	116	81.12	143	13	156	58	5.65	117	11.39	852	82.96	1027	56	1083

(Incomplete, Column 23: 23)

Those who ate 4 or fewer hours previously:

COMPONENT																		
Fruit	2	6.67	1	3.34	27	90.00	30	1	31	28	8.02	6	1.72	315	90.26	349	9	358
Meat-or-Cheese	0	0.00	1	3.34	29	96.67	30	1	31	38	10.92	23	6.61	287	82.47	348	10	358
Dessert	0	0.00	3	10.34	26	89.66	29	2	31	11	3.20	24	6.98	309	89.83	344	14	358
Crackers	0	0.00	12	40.00	18	60.00	30	1	31	7	2.01	94	27.01	247	70.98	348	10	358
Accessory Packet	1	3.45	4	13.79	24	82.76	29	2	31	13	3.77	40	11.59	292	84.64	345	13	358

(Incomplete, Column 23; 7)

Incomplete, Cols. 19-21: 113
All percentages computed on basis of Sub-total for respective group.

TABLE 11

Relation of Time Since Last Meal to Component Preference

	Like Very Much	Percent	Like Moderately	Percent	Like Slightly	Percent	Neither Like nor Dislike	Percent	Dislike Slightly	Percent	Dislike Moderately	Percent	Dislike Very Much	Percent	Sub-Total	Preference Incomplete	Not Tried	Total
Those who ate more than 4 hrs. previously:																		
Fruit:	774	65.98	300	25.58	57	4.86	27	2.30	10	0.85	1	0.09	4	0.34	1173	2	85	1260
																Incomplete, Column 37:		2
Meat:	588	47.50	380	30.69	108	8.72	62	5.01	42	3.39	29	2.34	29	2.34	1238	9	13	1260
																Incomplete, Column 38:		2
Dessert:	1488	53.89	709	25.68	244	8.84	161	5.83	59	2.14	45	1.63	55	1.99	2761	113	373	3247
																Incomplete, Column 39:		3
																Incomplete, Column 40:		40
Cracker:	350	30.36	380	32.96	157	13.62	149	12.92	66	5.72	29	2.52	22	1.91	1153	21	88	1262
Those who ate 4 or fewere hrs. previously:																		
Fruit:	265	72.01	77	20.92	15	4.08	8	2.17	0	0.00	0	0.00	3	0.82	368	1	26	395
																Incomplete, Column 37:		1
Meat:	183	47.29	124	32.04	36	9.30	15	3.88	14	3.62	7	1.81	8	2.07	387	0	8	395
																Incomplete, Column 38:		1
Dessert:	518	59.20	197	22.51	71	8.11	40	4.57	16	1.83	16	1.83	17	1.94	875	33	144	1052
																Incomplete, Column 39:		0
																Incomplete, Column 40:		14
Cracker:	109	31.23	132	37.82	43	12.32	30	8.60	13	3.72	11	3.15	11	3.15	349	5	42	396

Incomplete, Columns 19, 20, & 21: 113

TABLE 12

Consumption Related to Time Since Last Meal

Time Interval Since Last Meal	Number of Subjects	Percent Consumed of Available Calories	Average Caloric Intake
4 hours or less	394	74.7	893
Incomplete as to menu:	2		
More than 4 hours	1258	75.6	913
Incomplete as to menu:	4		
Incomplete (cols. 19-21)	113		
Total:	1771		

TABLE 13

Cracker Consumption Related to the Presence of Cheese

	Number of Subjects	Average Percent	Average Caloric Intake
Those who had cheese	138	69.27	153.8
Those who had other than cheese	1625	63.43	140.8
Incomplete as to cracker consumption (cols. 76-80)	4		
Incomplete as to menu (col. 38)	4		
Total:	1771		

TABLE 14

Relation of Cracker Quantity Recommendations to the Presence of Cheese

	Crackers								
	Increase	%	Decrease	%	Change	%	Sub-total	Incomplete Col. 35	Total
Those who had cheese	4	3.13	18	14.06	106	82.81	128	11	139
Those who had other than cheese	56	3.59	393	25.19	1111	71.22	1560	68	1628
Incomplete, Col. 38									4
Grand Total:									1771

TABLE 15

Recommendations for Quantitative Alteration---Cheese Versus Meats

	Increase	%	Decrease	%	Change	%	Sub-total	Incomplete Col. 35	Total
Those who had cheese	13	9.56	54	39.71	69	50.72	136	3	139
Those who had other than cheese	187	11.96	88	5.63	1289	82.42	1564	64	1628
Incomplete, Col. 38									4
Grand Total:									1771

TABLE 16

Consumption of Crackers Related to Fluid Intake

Cups of Fluid	Number of Subjects	(Crackers) Percent Consumed of Available Calories	(Crackers) Average Caloric Intake
0	285	59.5	132
1	647	62.6	139
2	500	65.3	145
3	158	68.5	152
4	70	70.3	156
More than 4	27	58.6	130
Incomplete in Fluid Quantity:	84		
Total:	1771		

TABLE 17

Caloric Intake by Weight Group

Weight Group	Number of Subjects	Average Caloric Intake	Percent Consumed of Available Calories*
Under 109	12	912	76.8
109-113	8	910	73.5
114-118	19	754	62.8
119-123	18	763	63.6
124-128	33	916	75.6
129-133	40	898	72.6
134-138	55	876	74.1
139-143	68	908	75.2
144-148	107	937	77.9
149-153	138	882	73.3
154-158	109	899	74.3
159-163	180	897	75.1
164-168	154	905	75.5
169-173	156	926	76.5
174-178	128	893	74.2
179-183	117	911	74.5
184-188	105	909	75.1
189-193	98	944	78.7
194-198	60	927	78.1
Over 198	152	929	77.2
Incomplete as to Weight:	7		
Incomplete as to Menu:	7		
Total:	1771		

* Computed considering each weight group as a unit, e.g.:

$$\frac{\text{Sum of Calories Consumed by Weight Group}}{\text{Sum of Calories Available to Weight Group}} \times 100$$

TABLE 18

Caloric Intake by Age Group

Age Group	Number of Subjects	Average Caloric Intake	Percent Consumed of Available Calories*
Under 19	12	887	72.7
19-21	259	883	73.6
22-24	240	909	75.3
25-27	268	918	75.9
28-30	359	921	77.0
31-33	321	915	75.7
34-36	157	874	72.9
37-39	47	920	74.3
40-42	39	890	72.9
43-45	28	996	83.1
Over 45	26	885	73.8
Incomplete as to Age:	8		
Incomplete as to Menu:	7		
Total:	1771		

* Computed considering each age group as a unit, e.g.:

$$\frac{\text{Sum of Calories Consumed by Age Group}}{\text{Sum of Calories Available to Age Group}} \times 100$$

TABLE 19

Relative Acceptability of Meat Items to Passengers and Crewmembers

	Like Very Much	Percent	Like Moderately	Percent	Like Slightly	Percent	Neither Like nor Dislike	Percent	Dislike Slightly	Percent	Dislike Moderately	Percent	Dislike Very Much	Percent	Sub Total	Preference Incomplete	Not Tried	Total	Grand Total
Crewmembers:																			
Chicken	64	73.56	18	20.69	3	3.45	1	1.15	0	0.00	1	1.15	0	0.00	87	2	0	89	
Hamburger	40	48.19	23	27.71	5	6.02	4	4.82	5	6.02	4	4.82	2	2.41	83	0	0	83	
Beef & Pork Loaf	12	22.64	19	35.85	4	7.55	6	11.32	6	11.32	2	3.77	4	7.55	53	2	1	56	
Cheese, Processed	14	31.11	14	31.11	8	17.78	3	6.67	1	2.22	1	2.22	4	8.89	45	0	6	51	
Meat and Spaghetti	50	52.63	33	34.74	7	7.37	3	3.16	0	0.00	0	0.00	2	2.11	95	0	0	95	
Beef and Corn	32	42.67	35	46.67	4	4.21	2	2.67	1	1.33	1	1.33	0	0.00	75	1	1	77	
Ham and Eggs	4	28.57	7	50.00	0	0.00	3	21.43	0	0.00	0	0.00	0	0.00	14	0	1	15	
Meat and Noodles	47	37.30	46	36.51	25	11.90	9	7.14	4	3.17	1	0.79	4	3.17	126	0	1	127	
Beef Steak	45	51.14	25	28.14	10	11.36	3	3.41	4	4.55	0	0.00	1	1.14	88	0	0	88	
Ham, fried	47	52.81	26	29.21	5	5.62	5	5.62	3	3.37	1	1.12	2	2.25	89	0	1	90	
															755	5	11	771	771
Passengers:																			
Chicken	70	72.92	16	16.67	6	6.25	3	3.13	1	1.04	0	0.00	0	0.00	96	0	0	96	
Hamburger	50	44.64	35	31.25	9	8.04	5	4.46	8	7.14	1	0.89	4	3.57	112	2	0	114	
Beef & Pork Loaf	32	32.00	27	27.00	14	14.00	6	6.00	6	6.00	10	10.00	5	5.00	100	0	1	101	
Cheese, Processed	30	37.04	24	29.63	10	12.35	4	4.94	1	1.23	5	6.17	7	8.64	81	0	3	84	
Meat and Spaghetti	54	45.76	41	34.75	9	7.63	8	6.78	4	3.39	2	1.69	0	0.00	118	0	0	118	
Beef and Corn	51	52.04	33	33.64	5	5.10	3	3.06	3	3.06	2	2.04	1	1.02	98	1	0	99	
Ham and Eggs	5	27.78	6	33.33	3	16.67	1	5.56	0	0.00	3	16.67	0	0.00	18	0	0	18	
Meat and Noodles	76	45.51	55	32.93	17	10.18	7	4.19	6	3.59	2	1.20	4	2.40	167	0	3	170	
Beef Steak	55	63.95	22	25.58	6	6.98	1	1.16	2	2.33	0	0.00	0	0.00	86	2	2	90	
Ham, fried	39	48.15	26	32.10	10	12.35	2	2.47	3	3.70	0	0.00	1	1.23	81	0	2	83	
															957	5	11	973	973
															Incomplete, Column 18:				24
															Incomplete, Column 38:				3
																			1771

TABLE 20

Component Preference Among Rated Personnel Based Upon Flying Time

	Like Very Much	Percent	Like Moderately	Percent	Like Slightly	Percent	Neither Like Nor Dislike	Percent	Dislike Slightly	Percent	Dislike Moderately	Percent	Dislike Very Much	Percent	Sub-Total	Preference Incomplete	Not Tried	Total
More than 500 Hours:																		
Fruit	304	63.47	130	27.14	23	4.80	13	2.71	5	1.04	0	0.00	4	0.84	479	2	31	512
Meat	236	46.83	174	34.52	40	7.94	23	4.56	18	3.57	7	1.39	6	1.19	504	3	5	512
Dessert	606	52.15	304	26.16	118	10.15	63	5.42	29	2.50	20	1.72	22	1.89	1162	47	119	1328
Cracker	135	29.22	163	35.28	63	13.64	53	11.47	28	6.06	10	2.16	10	2.16	462	11	39	512
Less than 500 Hours:																		
Fruit	69	76.67	12	13.33	6	6.67	2	2.22	1	1.11	0	0.00	0	0.00	90	1	4	95
Meat	48	52.75	23	25.27	7	7.69	3	3.30	2	2.20	2	2.20	6	6.59	91	1	3	95
Dessert	128	66.32	32	16.58	15	7.77	9	4.66	2	1.04	3	1.55	4	2.07	193	13	26	232
Cracker	28	33.73	30	36.14	6	7.23	10	12.05	4	4.82	3	3.61	2	2.41	83	4	8	95

TABLE 21

Distribution of Opinion Among Passengers and Crewmembers Concerning Roughness of Air During Flight*

	Smooth	Percent	Slightly Rough	Percent	Very Rough	Percent	Subtotal
Passengers	719	74.28	230	23.76	19	1.96	986
Crewmembers	604	79.06	146	19.11	14	1.83	764
							1732
					Incomplete, Col. 18:		24
					Incomplete, Col. 29:		15
						Total:	1771

* Significance of the opinions presented here must necessarily rest upon an assumption that relatively as many passengers as crewmembers were subjected to the various degrees of roughness during flight.

TABLE 22

Consumption on Smooth Versus Very Rough Flights

	Number of Subjects	Percent Consumed of Available Calories	Average Caloric Intake
Smooth	1334	75.0	900
Incomplete as to Menu:	4		
Very Rough	33	82.0	1015
Incomplete as to Menu:	1		
Not Considered in this Sub-population:	399		
Total:	1771		

TABLE 23

Consumption Related to Extremes of Environmental Temperature*

	Number of Subjects	Percent Consumed of Available Calories	Average Caloric Intake
Cold	202	75.8	911
Incomplete as to Menu:	2		
Hot	48	72.1	871
Incomplete as to Menu:	0		
Not considered in this sub-population:	1519		
Total:	1771		

* Grouped by coded replies 7, 8, and 9 Vs. 4, 5, and 6 of question No. 22

TABLE 24

Consumption as Affected by Items Supplementary to Food Packet

	Number of Subjects	Percent Consumed of Available Calories	Average Caloric Intake
Other than IF-4 Provision:	196	73.5	889
Incomplete as to Menu:	1		
IF-4 Provision, Only:	1531	75.5	910
Incomplete as to Menu:	6		
Incomplete, Col. 23:	37		
Total:	1771		

* During Flight, before opening ration, or with ration (Coded Replies 1, 2, and 3, vs. 4)

TABLE 25

Availability of Water During Flight

	Yes	Percent	No	Percent	Sub-Total	Incomplete (Col. 57)	Total
Was Water Readily Available ?	1620	93.59	111	6.41	1731	40	1771

TABLE 26

Consumption Related to Fluid Intake

Cups of Fluid	Number of Subjects	Percent Consumed of Available Calories	Average Caloric Intake
0	282	70.1	852
1	646	74.7	898
2	498	77.8	936
3	157	79.2	955
4	70	77.4	936
More than 4	27	75.1	914

Incomplete as to Menu:	7
Incomplete in fluid Quantity:	84
Total:	1771

TABLE 27

Frequency with which Various Fluids were Consumed

Fluid	Within Two Hours Before Ration		With Ration		Total	
	Number of Replies	Percent of Subtotal	Number of Replies	Percent of Subtotal	Replies	Percent
Coffee	489	26.87	829	42.86	1318	35.11
Water	233	12.80	121	6.26	354	9.43
Tea	30	1.65	370	19.13	400	10.66
Milk	44	2.42	40	2.07	84	2.24
Soft Drink	36	1.98	7	0.36	43	1.15
Choc. Milk	19	1.04	15	0.78	34	0.91
Others	24	1.32	13	0.67	37	0.99
None	945	51.92	539	27.87	1484	39.53
Subtotal:	1820	100.00%	1934	100.00%	3754	100.00%
Incomplete (Col. 25, 26)	76		62		138	

TABLE 28

Utilization of IF-4 Tea and/or Coffee Items *

In reply to whether tea and/or coffee were prepared from items in the ration, the following response was obtained:

	Coffee	Percent	Tea	Percent
Yes	652	42.4	415	27.0
No	886	57.6	1123	73.0
Subtotal	1538	100.0	1538	100.0
Incomplete, Col. 27	233		233	
Total:	1771		1771	

* Derived from answers to question # 13 on questionnaire by combining the coded replies as indicated:

	Yes	No
Coffee	1,2	3,4
Tea	1,3	2,4

Frequencies of the various codes were: 1, 209; 2, 443; 3, 206; 4, 680

TABLE 29

Consumption of Coffee in Hot Versus Cold Environment

Environment	Number Drinking Coffee	Percent	Sub-Total	Incomplete (Cols. 25, 26)	Total
Hot:	29	60.42	48	8	56
Cold:	98	48.04	204	16	220
				Incomplete, Column 58:	35
				Not Considered in this Sub-Pop.	1460
					1771

TABLE 30

Relation of Fluid Intake to Temperature and Humidity

	Cups of Liquid												
	0	Percent	1	Percent	2	Percent	3	Percent	4	Percent	Sub-Total	Incomplete (Col. 24)	Total
Environment													
Hot and Dry:	3	15.79	6	31.58	5	26.32	2	10.53	3	15.79	19	3	22
Cold & Moist:	14	30.43	19	41.30	10	21.74	3	6.52	0	0.00	46	1	47
													69
												Incomplete, Column 58:	36
												Not considered in this sub-population:	1666
													1771

TABLE 31

Difficulty in Opening Cans

	Yes	Percent	No	Percent	Sub-Total	Incomplete (Col. 31)	Total
Were the Cans Difficult to Open ?	82	4.68	1669	95.32	1751	20	1771

TABLE 32

Ranks and Grades of Personnel Surveyed

Rank or Grade	Number of Subjects	Percent
General	0	0.00
Colonel	18	1.02
Lt Col	52	2.96
Major	98	5.57
Captain	308	17.52
1st Lt	199	11.32
2nd Lt	80	4.55
W/O	8	0.45
M/Sgt	75	4.27
T/Sgt	124	7.05
S/Sgt	179	10.18
A/1	172	9.78
A/2	193	10.98
A/3	110	6.26
A/B	37	2.10
Civilian	105	5.97
Incomplete:	13	
Total:	1771	

TABLE 33

Types of Aircraft Encountered

Type	Number of Subjects	Percent
B-36	0	0.00
B-50	28	1.59
B-29	87	4.95
B-17	35	1.99
B-25	2	0.11
B-26	0	0.00
C-54	415	23.59
C-47	532	30.24
C-121	2	0.11
Other*	658	37.41
Incomplete	12	
	1771	

*The majority of aircraft so classified were of C-97 type

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